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MORRISON KNUDSEN CORPORATION ENGINEERING, CONSTRUCTION ENGINEERING, CONSTRUCTION

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WELDON SPRING SITE REMEDIAL ACTION PROJECT

WSSRAP GROUNDWATER OPERABLE UNIT (GWOU) SOIL SAMPLING REPORT

Task 852

Technical Memorandum No. 3840TM-5031-00

June 1999

Rev. 0

Prepared By

Morrison Knudsen Corporation Engineers and Constructors Group 720 Park Boulevard Boise, ID 83729

for

MK-Ferguson Group 7295 Highway 94 South St. Charles, MO 63304

WSSRAP

Chemical Plant

Technical Memorandum No. 3840TM-5031-00 Task No. 852

GWOU Soil Sampling Report

CONTENTS

- 1.0 INTRODUCTION
- 2.0 ENVIRONMENTAL SAFETY AND HEALTH
- 3.0 WASTE MANAGEMENT
- 4.0 DRILLING AND SAMPLING
- 5.0 DATA ANALYSIS
- 6.0 REFERENCES

FIGURES

Figure 1 - TSA Borehole Locations

Figure 2 - Bedrock Topography

ATTACHMENTS

Borehole Logs

1.0 Introduction

This memorandum describes the soil sampling activities performed as part of the RI/FS process for the Groundwater Operable Unit at the WSSRAP. Field studies were conducted in the temporary storage area (TSA) from February 3rd through February 19th, 1999. During that period, thirty-two boreholes were drilled and sampled. The work was generally performed as described in the Sampling Plan for the Remedial Investigation/Feasibility Study for the Groundwater Operable Unit at the Chemical Plant and Ordnance Works – Addendum 4: Soil Sampling for TCE at the Chemical Plant, (MKF&JEG, 1999). As stated in the plan, the objectives of this investigation were to:

- Identify the source of PCE and TCE contamination to the shallow aquifer beneath the chemical plant
- Delineate the vertical and horizontal extent of PCE and TCE soil contamination if a source area is identified.

Geotechnology Inc. was subcontracted to perform all drilling, sampling, and borehole abandonment as part of Work Package 476, Task 15.

2.0 Environmental Safety and Health

The drilling was performed in accordance with the subcontractor's safe work plan under the authority of the PMC site health and safety plan. PMC safety representatives performed an initial safety inspection of the subcontractor's drill rig and provided coverage throughout the fieldwork. Work was performed in modified Level C personal protective equipment consisting of poly-coated Tyveck® coveralls, latex gloves, steel-toed boots, safety glasses, and hard bats. Non-drilling personnel wore fluorescent safety vests. No safety-related incidents or accidents occurred during this investigation.

ES&H personnel provided constant coverage during the fieldwork. All soil samples retrieved during drilling were scanned for beta and gamma activity before leaving the work area.

3.0 Waste Management

Soil cuttings generated from the drilling and sampling within the TSA fence were not collected because additional excavation of contaminated soil within the area was planned. Other waste generated during the drilling inside the TSA such as personal protective equipment was bagged and disposed of as radioactive trash. For those boreholes drilled outside the TSA fence, the cuttings were collected and contained in lined 55-gallon drums and transported to the Ash Pond area and emptied. All other waste generated outside the TSA was disposed of as clean waste.

4.0 Drilling and Sampling

A total of 32 boreholes were drilled in six areas of the temporary storage area (TSA). Four borings that were originally planned for the south end of raffinate pit 4 were not drilled following reevaluation of sampling data which showed PCBs in the area. It was determined that PCB decontamination requirements would significantly delay a subsurface investigation here, therefore, sampling was not conducted. Collection of samples from this area will likely be performed at a later date.

The investigation boreholes were drilled at locations shown in the Sampling Plan except where access to the original location was limited. In this case, the borehole was moved the minimum distance (less than 25 feet) from the original location. Figure 1 shows the final locations of the TCE soil sampling boreholes in the TSA vicinity. Monitoring wells and previous soil gas sampling locations are also shown. Table 4-1 below is a summary of the boreholes drilled during this program.

Table 4-1 Borehole Summary Table										
Borchole ID	Northing	Easting	Ground Elevation	Total Depth						
TSA1-1	1042160.70	753592.60	666.56	49.0						
TSA1-2	1042132.60	753543.84	664.29	45.0						
TSA1-3	1042120.01	753456.60	665.56	48.5						
TSA1-4	1042078.35	753618.52	663.90	45.5						
TSA1-5	1042019.31	753455.53	659.02	33.0						
TSA1-6	1042043.73	753555.03	662.51	38.0						
TSA1-7	1041970.78	753568.11	661.84	39.5						
TSA1-8	1041899.53	753481.25	653.25	32.5						
TSA2-1	1041778.19	753479.33	654,15	26.5						
TSA2-2	1041732.92	753486.52	656.06	27.5						
TSA2-3	1041667.71	753480.84	656.27	34.0						
TSA2-4	1041619.59	753483.70	658.12	37.5						
TSA3-1	1041461.85	753480.41	656,11	30.0						
TSA3-2	1041481.03	753620.27	662.39	32.0						
TSA3-3	1041405.31	753555.52	665.00	42.5						
TSA3-4	1041328.06	753483.40	657.06	37.0						
TSA3-5	1041353.87	753646.26	665.63	31.5						
TSA3-6	1041262.41	753537.09	660.85	28.0						
TSA3-7	1041265.30	753645.58	664.54	37.0						
TSA3-8	1041321.03	753708.15	666.95	31.0						
TSA4-1	1041992.53	753941.03	664.25	45.5						
TSA4-2	1041937.33	753876.70	661.34	39.0						
TSA5-1	1041575.34	753828.02	660.53	28.5						
TSA5-2	1041471.95	753832.04	662.20	30.0						
TSA5-3	1041339.66	753831.92	666,26	35.0						
TSA5-4	1041255.53	753858.47	671.62	40.0						
TSA6-1	1041500.75	753936.36	665.39	35.5						
TSA6-2	1041449.67	753928.54	664.80							
TSA6-3	1041409.04	753933.60	664.25	34.5 35.5						
TSA6-4	1041399.07	753943.61	664.48							
TSA6-5	1041322.18	753933.63		35.5						
TSA6-6	1041316.97	753934.44	666.59	28.04						
D 1983 survey datum		7000744	667.15	36.0						

NAD 1983 survey datum.

Two drilling rigs were used to expedite the investigation. A truck-mounted CME-75 was initially used to drill and sample the boreholes. It was joined by an all-terrain CME-550 drill rig. Hollow stem augers with an inside diameter (ID) of 4-1/4-inches and outside diameter (OD) of 8-1/4-inches were used on both rigs. Soil samples were collected continuously throughout each borehole using a CME continuous soil sampler with an ID of 3 inches.

Soils were retrieved from the sampler and divided into 2-½-foot samples. Each section was split lengthwise and approximately one-quarter of the sample was immediately placed and sealed in a plastic bag and the remaining three-quarters was described by the PMC geologist according to

² In feet above sea level.

² Total depth at the top of bedrock.

⁴ Total depth above bedrock because of stuck sampler.

the Unified Soil Classification System and ES&H procedure 4.4.7. The bagged samples were later screened for volatile organic compounds in the headspace as described in Section 4.1.

All boreholes except one were advanced to the top of bedrock to characterize and sample the overburden soil. Borehole TSA6-5 was terminated at 28 ft. because the CME-sampler became stuck in the augers. After repeated attempts to remove the sampler, the augers were withdrawn from the hole, the sampler retrieved, and the hole was abandoned by grouting. Borehole TSA3-3 had to be re-drilled a few feet away from the original location after poor sample recoveries were caused by a wood piece plugging the auger bit. The re-drilled hole successfully reached bedrock with good sample recoveries.

4.1 Headspace and Laboratory Sampling

Headspace screening for volatile organic compounds was conducted on each 2-½ ft. soil sample collected during this investigation. A photoionization detector (PID) with a lamp suitable for ionizing the compounds TCE and PCE was used during the headspace screening. Results from this screening will be published in an upcoming completion report.

The Sampling Plan stated that those samples registering at least five times the levels measured in the atmosphere during PID screening would be selected for laboratory analysis. No sample obtained during the field effort registered this high. Therefore, those samples with any noticeably higher reading than background were selected for laboratory analysis. If headspace screening showed no samples greater than background, the top 5 feet of soil from the borehole was sent for laboratory analysis. Sampled intervals and results from headspace screening and laboratory analysis will be published in the completion report.

4.2 Borehole Abandonment

Each borehole was abandoned according to the work package specifications and Missouri well construction rules. When drilling was completed, a tremie pipe was placed to the bottom of the hole and the borehole was grouted to the surface using Grout Well® high solids bentonite grout. Each borehole was checked for grout settlement and topped off as necessary.

5.0 Data Analysis

5.1 Soils

Soils sampled during the drilling effort were relatively consistent across the TSA. Recent fill material related to the construction of the TSA was encountered in a majority of the boreholes ranging up to 13 ft. deep. The thickest areas of recent fill were seen in Area 1. The recent fill was characterized primarily as re-worked Ferrelview Formation clay with its distinctive high plasticity and mottled colors. Pre-TSA fill material placed during the construction of the chemical plant was also encountered in most of the areas, sometimes beneath the recent fill. It

ranged in thickness up to 6 ft. and was distinguishable as a dark colored, low plasticity, siltier material.

The native soil stratigraphy in the chemical plant area is described in detail in the GWOU Remedial Investigation Report (MKF-JEG, 1997). Native soils encountered beneath the fill were consistent with previous drilling in this area of the Chemical Plant. The Ferrelview Formation, a high plasticity clay, was commonly found beneath the fill or at the ground surface at thickness' from 8 to 21.5 feet. In a few areas, the Roxana Silt, which overlies the Ferrelview, was described and where identified, it ranged in thickness from 2 to 9 feet. Below the Ferrelview Formation was the clay till unit, which ranged in thickness from 7 to 21.5 feet. A subunit of the clay till, the basal till was described in a two of the boreholes. Beneath the clay till and directly above the bedrock surface, the residuum unit was usually encountered prior to auger refusal on the bedrock, however, some boreholes showed no discernable residuum soil. Overall, this unit was generally thin in comparison with other areas on the site, ranging in thickness from 1.5 to 10.5 feet.

5.2 Bedrock

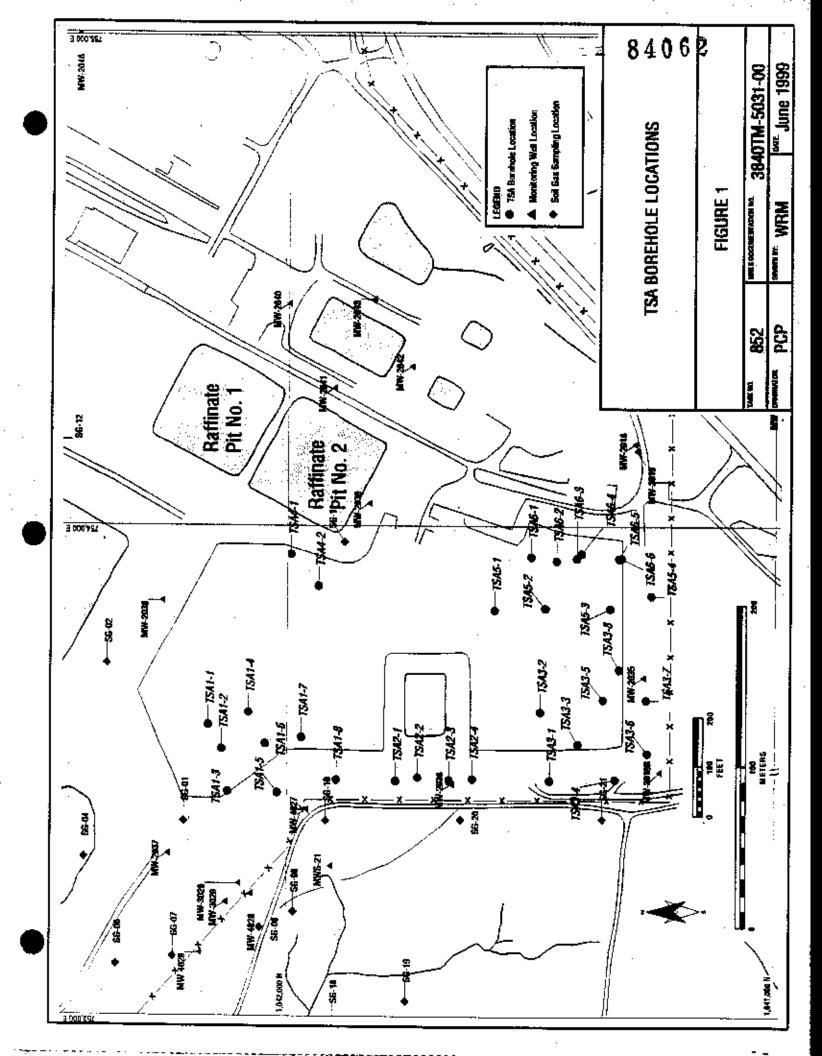
The weathered surface of the Burlington-Keokuk Limestone was encountered in the majority of the boreholes drilled in the TSA area. Auger and sampler refusal generally indicated that the bedrock surface had been intercepted. However, because of the cobble and boulder-sized rock fragments commonly found at the base of the clay till unit or within the residuum overlying the bedrock, sampler refusal did not always indicate the top of the bedrock. In some cases, an SPT sampler was driven to confirm the top of bedrock.

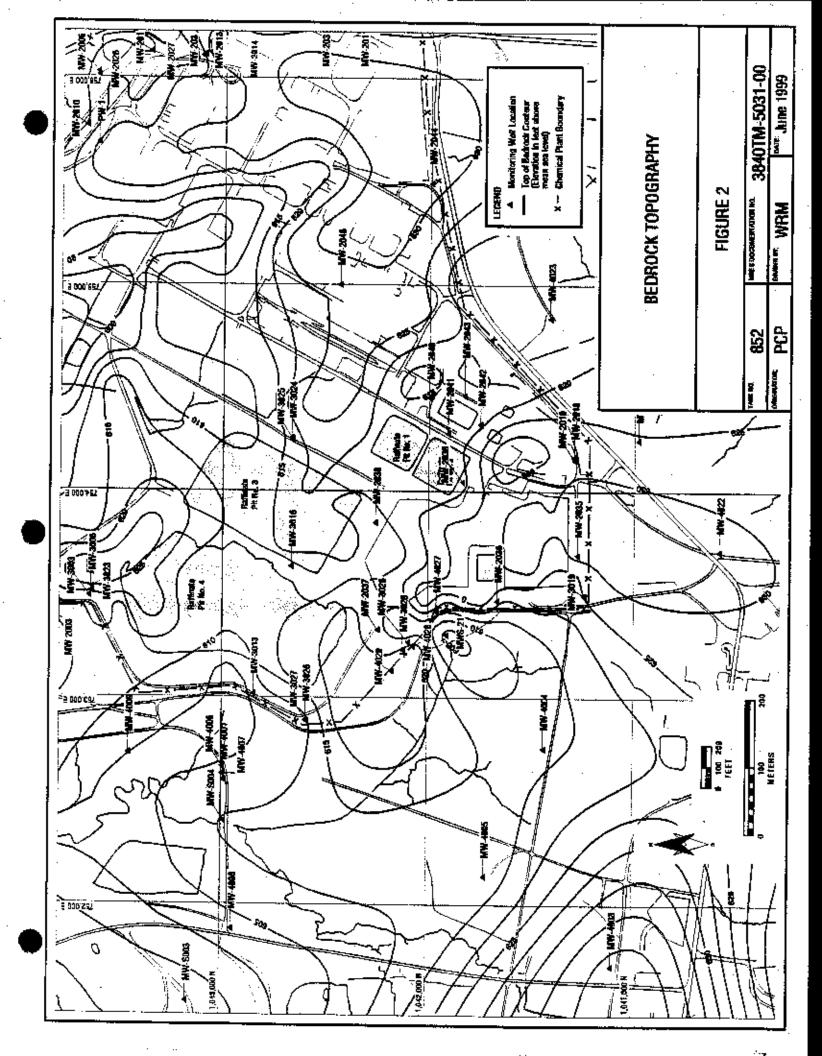
Figure 2 shows the bedrock topography after incorporating borehole data from the TSA area and recent drilling performed within Raffinate Pit #3. The most notable effect when compared to previous mapping is the greater definition on the bedrock surface in the TSA area. No significant changes to the overall morphology of the bedrock are noted.

6.0 References

MK-Ferguson Company and Jacobs Engineering Group. Sampling Plan for the Remedial Investigation/Feasibility Study for the Groundwater Operable Unit at the Chemical Plant and Ordnance Works – Addendum 4: Soil Sampling for TCE at the Chemical Plant, DOE/OR/21548-445: 4, Prepared for the U.S. Department of Energy, Oak Ridge Operations Office. St. Charles, MO. January, 1999.

MK-Ferguson Company and Jacobs Engineering Group. Remedial Investigation for the Groundwater Operable Units at the Chemical Plant Area and the Ordnance Works Area, Weldon Spring, Missouri, DOE/OR/21548-571 (Final), Prepared for the U.S. Department of Energy, Oak Ridge Operations Office. St. Charles, MO. July, 1997.





ATTACHMENTS - BOREHOLE LOGS

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Hole Number
TSA-1-1

Location: Project. TZE CoeNER OF TSA SOURCE INVESTIONTION NW STANDARD SAMPLE TEST MESULTS SYMBOLIC LOG RECOVERY Name, Gradation or Plasticity, Particle Size Distribution, #TERW! Color, Moisture Content, Relative Density or Consistency, 6"-6"-6" Soil Structure, Mineralogy, USCS Group Symbol (M) (22-45) Sily CLAY; id bin; med plas; some sult; some clay; little of, gty : feld, subary sond; to hypry 5_{/5} weathered greating ebs; stiff; daup; no oder; MuDr NA 29 29 30 5/5 μß حان 5/5 NΑ 39 NO LEC 45 FROM 44 [CLAY TILL] (45-49) Clayer GRAVEL; white - Higrary chart; le gravel (map 5/5 Size 3"); little i plas hous; clay matry = rdbin; i dense; damp Provided; subang- subsound grand appear mad weathered NΑ GC - 47-49 nograce present, clayes . hyppies white-11-3101 [Res 49 Bor - Terminated 10 49' bgs, due to anger; samplem 50. upon incompetent bed with Boring bucht ber laute slury. Suple collected in 1-gal Zeplas (25 whereals as composites for PID headspace analysis

(3)
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MORRISON KNUDSEN CORPORATION ENVIRONMENTAL SERVICES GROUP

BOREHOLE LOG

\vdash												1	<u> </u>	
Pi	roject: TU	= <	MICH	7-	100/10	4			Location: JW COL	NEV	OF TSA			
	oordinalge	::					<u>-</u>	Oriting Contractor:						
_	<u>1042</u>	_		<u>4/:</u>	<u> 75354</u>	<u> 13. B</u>	<u>4E</u>	لـــــ			101004	- 		· .
P	rii Make e CME-S			דע א	דאטס				h Top of Rock:		Depth Casing & Size:	: ∺	ole Size: おぶ	
Ē	levation:					Angle fro	m Vert. An	d Bear	ing:		Depth Bottom of I	lole:		·
L	<u> </u>		4.29			V <i>E</i> 1	etical_		(*)	τ	· 45 ′	τ.		
۱۳	later Level	: NA		Fluid &	Additives: NA		Oate Sta	7a/s	77		Floish: 2/11/99	Logg N	er. Boss	
_	<u> </u>	 	SAMPLE	<u>. </u>	CRACHATE				<u></u>		OIL DESCRIPTION		. /	
Į.	ŀ			>-	PENETRATION TEST RESULTS	ا ا	\$1ama	Grad	stinn or Alac	nei olen (Particle Size Diet	dhi diga		
ELEWATION	±≱ÿ	₹	4 2	ECOVERY	6*-6*-6*	골					Particle Size Distr ive Density or Cor			
Š	DEPTH BELOW SURFAC	NTERWAL	TYPE & NUMBER		(N)	SYMB	Soil Str	uctur	e, Mineraloç	3y, US	CS Group Symbo	1		
<u>ш</u>	000	0	-2	-			(A (I)	<.11.	· MidW.	Ш	(1 11 . 11 .		L , ,	1 (1)
	ļ -	~					11-07	- /	7 (27)	MOTIU	ed rd bin ! Itigi	45	Mynghas 1	HU_
	-	-	_	44) NA	1	51H)	Some	ciay 5 to	v+ -	m fly sand;	+v- 1	little suba	
	-		CME-		1384		truste	you	; days;	3/1	4-v.shiff; 14	wark	el : no al	<i>₩</i> . ∃
] _	4	₹			_	11.00	`.L.	: Len		to smeet)	ر"
		4					1. MO O X	.S T444	~ / FCO)	X /1100	ZO ! SINCLA			
]• _]	i			CL								
	! "	1	Ŋ	5/5										7
	-	1	7ME-2	''-] NA	1							•	
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	10 —	-		İ									. ,	ر زم
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	} .	_		5/5	NA.	1	11-20	اء ر	UAY 5 MOT	tled	rdbra! Higray	3 My	ا ز معام ریمو	fr _
	Ι.	_	Ē		,		19H3 s	and a	elay; to	W 3	ubangty san med); no odor me FeOs w	1 : 1	stiff de	- زصما
	Ι.	14		<u></u>			W. ave	m.t.	ochs la	es the	سلموه و الميه	. w.	n / n	//_
	ļ	14				Ι.	6		$\frac{1}{L}$		יוטטטטווי ככביי) MIN	UX 5tung	·
	1/5	7	_	1		€ H	te Ox	(NOD	is our	usc	m teor wi	def	7747	_
	'	٦	1-3m	5/5	l	ļ			,					
	'	1	\$	12/12	NA.		-15-	201,	clayus	pick	ion, 11.5ry w/	<i>₩</i> .	FeOx stam	
	}	_ي ا	د ا		i .		1		1	•	- 1		•	-
		1 12		 	. 	┥					Γ	Jane	e ferre / vi	تاریخ
	20-	┥╵╵				-			- 13 - 0					
		4	\ \	_ إسر			(16-32	<i>ا (۲)</i>	5, My CLA	430	d brn ; med place	03 Sa	ne silt; sa	me clay
		4	1	1215	LIA	-	little 1	of, 4	3 Suban	n 50	nd; tr. high w	real	haved gran	лі-
		_	<u>¥</u>		MM	1,,	pebs	i sti	H; daw	0:	no odor : abu	and a	1 MNOX S	stain-
		24					1 /	, - ,.	,	1	nd; tr. hyd u no odor; abu		a processor .	_
	26	24	عدي	1515	NA								TILL]	
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MORRISON KNUDSEN CORPORATION ENVIRONMENTAL SERVICES GROUP

BOREHOLE LOG

Shee: Z of Z
Project Number:
WP-476, TASK 15
Hole Number

					· ·				1-2
	Proj	ect:				1	Ï.	Location:	":
	Ļ	ILE				همو اکر بهدر	74~	NW COENER OF TSA	
		ŀ		SAMPLE		DRADHATZ HOITARTSHEP		SOL DESCRIPTION	
		DEPTH BELOW SURFACE	INTERVAL	TYPE & MUNBER	RECOVERY	7257 RESULTS 6"-6"-6" (M)	SYMBOLIC	Name, Gradation or Ptasticity, Particle Size Distribution, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy, USCS Group Symbol	
	2	ج • •	24 29	CME-L	s 5	N4		See pg 1 for description	- -
1576	3	30 — 1 1	27 34	cme-7	5/5	μ A	CL		 - -
528 •	3	\$ -	34 37	CME-8	5/5	NA			 - -
550		40	39	CME-9	5/5	HA	6c	(40-425) Clayay GRAVEL; Hyray grand yell ton matrix; 5 funds (clay; 51H); little subary charty sand; dente; d. p. 501 hd; p. bound; no odor EBoard (425-45) Clayay GRAVEZ; whate- Itary grand, & robottle place funds (elay); grand is chart; mod weather	eme u plas _ emp-most; Till?]
1608	, [_		95-1	1/1	NA	GC	2" me i de de de de combode de Condo	. ' ' '
•		45—	-					Borry ferminated 0 45 by due to sampley refused upon imperetrable Residences Borris wolf bendonte story upon completion. - Samples were collected in 1-gal Zaplas 12 to compenses for PID hadopare analysis	balfilled

Trace of som

gravely noticed yellow prown, with

والرجان والرادارة وكالمتحافظة أكلاب والمتعاطما

gray and Stack (Mno). Moist, V.

Ferrelview

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MORRISON KNUDSEN CORPORATION ENVIRONMENTAL SERVICES GROUP

BOREHOLE LOG

					•		7-(A-/-2
	1CE	ar	L +/	ے ے	STANDARD	PI	ant Inside TSA, NW SOIL DESCRIPTION
ELEWION	DEPTH BELOW SURFACE	INTERWAL	TYPE & NUMBER	RECOVERY	PERETRATION TEST RESULTS 6"-6"-6" (N)	SYMBOLIC	Name, Gradation or Plasticity, Particle Size Distribution, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy, USCS Group Symbol
oazs	產	25.0	CME	5.0			Fat Clay (CH) ~ 20% Send, trace of fine graved, minor Fel noductors, predominantly yellow brown with streaks of 1 1961 gray and black, both appear to follow fractures.
	30	30.0	CME 7	50			damp to Moist, Vistiff, CLAY TILL / as above, scattered gravel & 101 fine to up to 1", hight gray does fortown fractures (Mostly healed), black also follows fractures (open) but also as nodules.
	35-	35:0	CHE Q				foreveres (Mostly healed); foreveres fractures (open) but also as hodules yellow brown only CH as above, grave (pockets of chart up to 20, Clean fractured)
Ado	_	40.0	CHE	50		_	black conting fractures. Lean Clay, Silty, 1866 from with
-	45	45.0 75.0	9 CME	40'		-	Cimer gravel, (GC), angular chart with partie clay matrix, o range brown.
010	9 0—	48.5	10 5PT	2/2 =	25/24		at 47: 3" seam of high plastic cloyed Residences T.D. 48.5' 1020, on Linestone: 2/11/99
•	-						Hole beet filled with Groot Well ben tonite slurry

					EN CORP		ION 1		. —		Sheel	
					BOF	EHC	LÈL	OG			Tas	£ 852
	· · · · · · · · · · · · · · · · · · ·		3.	0°Z	-D- C	ME	Com	fina ous	50	upler	Hote Num	4-1-4
֓֟֟֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓	Project:	Ea	+ +	L	Chem	Æ	ant	Location:	. 7	5A. N.	V .	
Ī	Coordinates	t.						Dritting Contr.	actor:	· · · · · · · · · · · · · · · · · · ·	· .	
ħ	Odli Maka s	and Made	d·		<u> </u>		<u> </u>	Depth Top of Rock		Depth Casing & Size	: Ho	le Sizn:
ļ	elevation:			4.5	- Ang		xm Vert. gn	45.5		Depth Bottom of	Hote:	14"/814"
ļ	Mater Level	<u>663</u>	.20	le e	·		erta	cal	1=	45.5		
ľ				p	Additives:			t: 1535 10/99		inish: 16 45	Logge	Ben fer
		<u> </u>	SAMPLE ZO"		STANDARD PENETRATION TEST				'St	OIL DESCRIPTION		7
5	- × 5	_ ₹	0,5	/ERY	MESSET 12	身	Name,	Gradation or Pla	sticity,	Particle Size Dist	ribution,	
E W	DEPT BELOG SURFY	NTERWI	TYPE	ECOVERY	6"-6"-5"	SYMBOLIC	Soil Str	ucture, Mineralo	gy, US	CS Group Symbo	i isistenc	" . [
=	L LL CO	0	ME	<u> </u>		. w	100	e clay.	60	merical de	we.	brown,
	-	1 '	1				as	and dut	F	0 nodale	5,4	isist, ,]
			′	5.0			547	44.		Kework	Ecol 1	Gerelwent
	-]							.	. ,	•	~ フ]
	5-	50	<u> </u>				5-6	er, old to	هی هر و	" E	زر]
] _	50	CME			<u> </u>			a			6.0
•	ļ -		CME E	5.0			Lean	2. 1.44 (). 2. 16 - 16	\mathbf{z}		+ 2	e brown e
	-	4		:			MOG	والمنكو بمعوستك والمعجبك	٠, ٠	Ferr	ei vi	
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	10-	10.0				_	(K	Xanda-1	يعتده	פ		l
	-	10-0	CHE	·			<u> </u>	n/au/n 4)	2220	til o rang	e 60	2. Marst
	-	1	3	56			11:44	6 Bour 1.		En Contraction	J#5.	Massin
	-	1					hiok	ly Dlast	ر ے	Norst Sty	4,51	ickonside
	- سرا	مخد					ati	3', Host	4	light gr	フィ	·
	/s —	15.0			· —			- _	•			
	-	1 4	CME	رار			, ا	Hasal	ورامك	<u>. </u>		1
			4	حد			-	<i>,,,</i> ,		_		آ - در
]	<u> </u>					Z	classes	71.	+10%		18.5
	zo_	20.0					fine	glavel	Ho	ttled yel	low.	Streets LAYTILL
	-	20.0	CHE	٠,			6100	on light	950	y wietle p	fact.	SFreedes
	-	1	5	50			CMM	/ 3/	77	er serry	0	LAYTILL
	-	4					a -	r clipto	607	10 Sandy	10/6	fine grut.
l	- ر ـ ا	1					on	enge al	rode	west and	stre	ath light
	25_	250	<u> </u>	- ::	<u> </u>	!	1/2	her an	ve/	at 24's	CLI	BY TILL -



╸	Project:			<u>-</u>	 .	<u> </u>	
[7 <u>z</u>	Ea	+H	<u></u>	hem f	lan	Inside TIA, NW
			SAMPLI	<u> </u>	PERETRATION	ı.	SOIL DESCRIPTION
ELEVATION	DEPTH BELOW SURFACE	INTERVAL	TYPE & MUMBER	RECOVERY	7851 785ULTS 6"-6"-6" (N)	SYMBOLIC	Name, Gradation or Plasticity, Particle Size Distribution, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy, USCS Group Symbol
	30	300 300	CME G CME 7	5.6		•	Fat Clay (CH) yellow brown, ~20% saul, ~10% gravel, streaks of MnO, Moist, vistiff. Chay TILL at 29' increase in gravel As above, light gray and black tend to fodous fractures; damp -
•	35-	35:0 35:0	CME B	5.O			as above to 36.5. at 36.5-37.5, heavy gravel 2000- 27.5-39.0', light brown. Very silty. Clay-
	45	450	сме 9	4.0			Clayer Gravel, (GC) angular Chart, red- divid brown to brown high plastic Clay matrix, Moist, dense. Lesidena
							T.D. 45 5, probabably bed- rock, 1445 2/10/99 Hole backfilled with Growt Well bentonite slurry.

(13)	MORRISON	ĸ
=	ENDADAMENT	-4

NUDSEN CORPORATION VIRONMENTAL SERVICES GROUP

BOREHOLE LOG

Project Number: WR-476, Tack 15

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		CE.	INV	ESTI 6A	אסת				OF TSA (<u> </u>	
	•	9. ≥	111	7524	55	C36			OLDENY		
rill Make ar	nd Mode	l:					th Top of Rock.			• :	Hole Size: 8.5"
levation:	15	9.02	2		Angle to	m Vert. and Sea 17 Offic. (1	ring:				
rater Level:	JA	·		NA		Date Start: 2/19	199	Oate F	inish: 2/19/99	Ļ0	^{No} N. Bass
		SAMPLE		PENETRATION				\$0	HL DESCRIPTION		
DEPTH BELOW SURFACE	WTERWL.	TYPE & NUMBER	RECOVERY	6"-6"-6" (N)	SYMBOLIC	Cotor, Moist Soil Structur	ure Content, re, Mineraloç	Relati y, US	ve Density or Co CS Group Symb	ansiste ol	ency,
0 1	35	CME-1	35/ 35	ΝA	F	little s SUbani	ilty some c Tresh a	elay. rave	truf-m	gty 466	send ; tr. little
5 — - -	, 5 .5	CME-2	⁵ /s	НФ	(tc)		~~) No 66	י ^{יסע} א	MWOY 5-tau		Fil. Ox nodo - (smared)
ļ <u>-</u>	B.5	<u> </u>			ðL.	(8-85)	Sitty CLAY	5 b/R	351-med pla	011	ittle sell; some
//o —	13.5	CME-3	5/ ₅	ΝΦ	CH	(8.5-16)	CLAY 5 P	nottle	drd bin	<u> </u>	mement Topson]
 15	13.5	ME- 4	5/5	ИV		gramtii en sided Node	(v. weether j 10 octo	red) +5 1	petoj v.sti MN OKStam	ر 44 مصر سے د	damp; slick bundand FeOr- ernel view]
20	185	2	5/5			weather	1) little d grant	v+ 9 ii p-	ety; gobern	300	d: tr. high -
-	23 S 28 S	C C C C C C C C C C C C C C C C C C C	5 /5	NA NA	cı	- > pe!	i content	w/ c	depth	ŗ	
	oordinates Out init Make at CME levation: ANOTHE	TCE SOUR COORDINATES: IN A PROPERTY OF THE P	CE SOURCE OORGINATES: OFF SOURCE OFF SO	TCE SOURCE INVOCATION IN THE PROPERTY OF STATE O	TCE SOURCE INVESTIGATION OORGINATES: 1042019.31.M 7534 TIMBRIDGE ATV-MOUNT MENTEURON: OS 9. 02 FILID & ACCTINGS: NA SAMPLE BURGERATION TEST RESEARCE (N) OO 0 1 35/35 NA SS 5/5 NA 10 - 35 5/5 NA	TCE SOURCE INVESTIGNATION CONCINENCE: POLICY 219.31N 753455: INIMINATE and Model: CME-SS ATV-MOUNT REVELION: INA SAMPLE ADDITION SAMPLE ADDITION INIMINATE ADD	TCE SOURCE INVESTIGATION OPPORTURE TO MODEL THE MAKE AND MODEL CME-55 ATV-MOUNT Angle from Vert. and Base VETT ONT. (1) Angle from Vert. and Base VETT ONT. (2) Angle from Vett. and State Vett. (2) Angle from Vett. and State Vett. (2) Angle from Vett. and State Vett. (2) Ang	TCE SOURCE INVESTIGATION OPERATION OPERATION INVESTIGATION Diagrap Contract CONTROL 21 N 753455 53E Diagraph Top of Rock CME-55 ATV-MOUNT REVENDED SAMPLE PRINT TRANSP TRUE SAMPLE PRINT TRANSP TRUE SAMPLE PRINT TRANSP TRUE STANDARD OF D TANDARD TRUE STANDARD TCE SOURCE INVESTIGNATION OVERLET OFFICE SOURCE INVESTIGNATION PRIMARY The Source Investigation or TSA (Ordinate Depth Top of Proce Depth Top of Proce Ordinators (Ordinators Ordinators) Ordinators O	TOCK SOURCE INVESTIGNATION NW CORNER OF TSA (OUTSOCRITCHE SOURCE INVESTIGNATION) NW CORNER OF TSA (OUTSOCRITCHE SOURCE SIZE OF TSA (OUTSOCRITCHE SOURCE SIZE OF TSA (OUTSOCRITCHE SIZE OF TSA (OUTSOCR		

			
Co.	MORRIS	ON KNUDSEN O	ORPORATION
	HELD IN HO.		CITI CLEANER
-	ENVIRONM	IENTAL SERVICES	GROUP

Sheer: 2 of 2

Project Number:

WP-476 , Touk 15

Hole Number

788 - 1-5

			-			TBA-1-5
roject: 7	-CE	5 0€	RLE	INU	E\$174	CATION NW CORNER OF THE COUTSIDE FETULE)
T		SAMPLE		STANDARD		SOIL DESCRIPTION
DEPTH BELOW SURFACE	WTERVAL	TYPE & NUMBER	RECOVERY	PENETRATION TEST REPRACES 6"-6"-6" (N)	SYMBOLIC	Name, Gradation or Plasticity, Particle Size Distribution, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy, USCS Group Symbol
25 - -	23.5	2-3m0	5/5	ИФ	ور	(See pg. 1 for description)
30 — 30 —	28.5	CAME:-7	45	, на	GIC	grand ; red clay matry; little U plas feres; vidence
35 —						Boring terminated @ 33' by due to awar) sompler referred upon imperitrible Reickum Brring backfilled w/ bestonite sturry upon
#0 —						Semples collected in I god 2 mg/000 25 intervals as composites for PID readque
45 -						analysis
50 —	- - - - -					
_						•

_		_		
⋒ `	MORRISON H			
(CO)	MORRISON K	(Milheen	CARRADE	MULTA
MAN.		~1003611	CONFOR	W11011
~ F	NVIRONMENTA	I SPRVICE	COMPOS S	

Sheer _____ ot _____ Project Number: WP-47b; Trah!5 Hole Number TSA-1-6

P	TOJECT:	E 5:	nU L C	 E -	□ NV€ ≾ 7	7 <i>(-4</i> 77)	NW CORNER OF TSA
þ	continutes	:					Drilling Commetter:
	riil Make s	<u> </u>	ł:		1 7535 17	. کرک	O 3 E GFO TE CHNO LOGIA Depth Top of Rock: Depth Casing & Size: Hole Size: NA HA B.5"
Ē	evation:	-					m Vert. and Bearing: Depth Bottom of Hole:
ŀ	Vater Leve		2.5		Additives:		Date Start: 1 (0°) 38' by Logger:
L	· · ·	VA			HA		Date Start: 2/10/99 Date Finish: 2/10/99 Logger: N.B055
			SAMPLE		STANDARD PENETRATION TEST	ı	SQL DESCRIPTION
ELEWITON	DEPTH BELOW SURFACE	INTERWAL	TYPE A NUMBER	RECOVERY	6"-6"-6" (N)	SYMBOLIC	Name, Gradation or Plasticity, Particle Size Distribution, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy, USCS Group Symbol
	-	T 3	Come-1	3/3	ŅA	0.1	(0-65) 5,144 CLAM; mottled vel bin ; 11. gry; high plas; bette sits some clays tr. of - m gin sands - tr-1,1the subary fruit 10 grand; daups reworked; -
	<u> </u>	3	۲. د	51			compressed 5 no odor; MN Drstain; Fe Dr nodule
	- - -	2	CAME-	15		01	(5-65) 5.1ty CLAY; ble; st-melplas; little self; some clays to subany is sowel road base; damp; organic odor; 10015 [Remaint Topsoil]
	 10	8	CME-3	5/5		-	(65-16) CLAY; molled od bin ! Higry; highplass frace silts some clay; tr. of subangety sands vistiff; daup- dry; no odor: Minde stain; Fe. Or nodules; [Native Ferrel view]
	- 15 -	13		5 5			-> sult to 25% Line 8-11 bg
	-	13 18	CME		<u>.</u>	 	(16-32) Silty CLAT's rd bin; med place; some scalt; some eley; little of, ely, subong soud; tv. num winther grante jebs; shff; damp; no ociar;
	20 —	23	CME-5	5/5		CL	-7 soul (2 sell sinte - from 20-22 (Sandy S. F)
	25	20 20	mE-6	5 \8	•	:	

673MADDISAN	VMI INCENT	ころりりんりょう へい
MORRISON	アソウトシデジ (JURPURALIUN
ENVIRONMENT		
EMAINTH/WIEN!	AL SERVICES	GROUP

Shee: 2 of 2 Project Number: WP-476, Took 15 Hole Number

Project: SOURCE TCE INVESTIGNATION NW Corner of TSA STANDARO PEKETRATION SOIL DESCRIPTION RESULTS Name, Gradation or Plasticity, Particle Size Distribution, TYPEA Color, Moisture Content, Relative Density or Consistency, 6"-6"-6" Soil Structure, Mineralogy, USCS Group Symbol (N) Suppl for do suptim % NA 28 5/5 ΝĤ 33 (325-36) Silty CLAY; Higry; Med-High pleas some sit 23 some clay; stiff; lammatel; ory; no odor; Fe Ox stein to grantic pelos [Bone Tile] CL 5/5 35 ΝA Gol (up to 3") s lettle plan fores; clay mo to in a rolling vident; dearly of sorter of some of the sorter of the 38 Boring termetre @ 38' tops du to Sander/auger refused upon impense trable Residence. Boring book 40 felled w/ bentoute storry. - Sayets collected in I gal Ziploro D 25' intervals as composite for moite PID head Spire Screening



MORRISON KNUDSEN CORPORATION

ENVIRONMENTAL SERVICES DIVISION

BOREHOLE LOG

Project Number:

Hole Number

И.							 				154 ·	<u> </u>	
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Ļ		970.	78 N	<u>/ :</u>	7 <u>535</u> 4	8.11		Driffing Control	o fec	Lnolog			
L	CM	<u>-</u>		4	s. au		~	30'		opth Casing & Size:	Hole Size		
Ľ	Elevation:	1.8	4				om Verland B			Depth Bottom of H	iole:	. —	╗;
ľ	Mater Level	:		Fluid 8	Additives:		Date Start:	1015		sh: 1420	Logger:	1	7
	T -		SAMPLE	E	STANDARD		2/10/	99	\$01L	1/99 DESCRIPTION	1 /4.	15cm f	≤ ∤
₹	"	٠,	30 <u>"</u>	*	TERT RESULTS	υ	Nате. Gr	adation or Pla	sticity Pa	uticle Size Distri	hution	· · · · · · · · · · · · · · · · · · ·	\neg
BEWT	DEPTH BELOW SURFAC	INTERNAL	TYPE &	RECOVERY	61-61-61. (N)	SYMBOL	Color, Mai	isture Content	. Relative	Density or Con Group Symbol	sistency.		
		0	CME				0	-6-1		- Sec.			7
			1	5.0	ļ					elview	Hay -	FILL	1.
	_				ĺ		772	ca-qn	wer .				1
			1										7
	5-	50			<u> </u>	_[ا			at gray	. 200E	t, Stiff	7
	_	5.0	ME		·		Eser	clay(c)	4), æ	WE 717			
•] -		CME Z	50	<u> </u>		45-	7.5 . 11	ùes fi	me grave	of with	h clay]
ς	1 -						Mat	ix, pro	60.61	me grave to old re lay (ces), o	olive D	ر معادم	
	ļ -		,				1 7 AS	1,541		7000	Lich	7.]
	10-	/0-0 /0-0			·-···		per s	1, 41.77	•				_
	-	20.0	CME				Lean	lay, Sil	ly, on	w/c 6100	n= 119	4+91-2	4
	-		3	5.0			100 FE	alband,	and d	stack men st, Vost	000	aben Ala	4
	-			. •		-	Fiest 10	Can Chin L	· Con J	mye L		:	13.
	-	.					بعبيبعك	lught 9.	وروس	4º FeO	tadecle	-ر کے:	_
	15-	 0			 -	-	Liter	very S	~209	MALSIVE	Lander L	hirox15.0	'
	3		CHE				Coarse	19min	MOR	Had often	gebon	M	4
	1		4	2.0			light	That	SE Y	stift	LAYTIL	17.5	4
		14					fato	elbrown	1 link	to say, be	set u	efed assive	Ŧ
	2	200					Moist		(4)	Stechanse	ded -	مرجر	7
		200	CME				Fat Cl	ey (CH) -	-10%	fre to	crse s	Sand Arrana	,
			7-	ا م			-50	fine 9	TY!	gray 6	MELLONI MARINE	rable	1
				J,U		.	black	MUO. I	Hoist	Vist. F	4. C.	LAY TI	3
					:				, = •	, , ,	•]
	25-	25,0											



Sheet of 2
Project Number:

Table 8 52
Hole Number

							73A-1-7
	Project: TC	Ea	+1	e C	hear	Pla	nt Uscide TSA, NW
	.["		SAMPLI		STANDARD PENETRATION		SOIL DESCRIPTION
	DEPTH BELOW SUNFACE	INTERMI	TYPE & NUMBER	RECOVERY	TEST RESULTS 6"-6"-6" (N)	SYMBOLIC	Name, Gradation or Plasticity, Particle Size Distribution, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy, USCS Group Symbol
1330	-	25.0	CME G	50			fet Clay (CH) ~ 15% sand at ~1090 fine gravel, Moffet of yellow brown, - orange brown, light gray & Block, some FO nodules, MhO Streaks, Mois Very Stiff, highly plastic CLAY TILL
	30-	300	CME				
युर		>	′		ا ا	*5	FRECION (CH) Hottled rollich brown, orange brown, want for the FED nodules, March, V. Stiff - Hopply Plastic ChayTill
•	35-	55.0	CME 8				Moist, Vistiff - Highly plastic ChayTild Clayer gravel, red High plastic clay was trixlet Pesidoush As above, red, orange brown, light brown black, zones of less gravel 39
	40-	38.0 37.5	SPT		Z8 28 30		Chart and weathered linestone
	-						hole backfilled with Grout Well benton te starry
	45	-					
	-				•		
	-						· -
•	-		į				
			_		:		<u></u>

MORRISON KNUDSEN CORPORATION **ENVIRONMENTAL SERVICES GROUP**

BOREHOLE LOG

Project Number: WP-476, TASKIS
Hole Number
TSA I-8

											1301 0	
Project		0	·	. د . دستور		4 + A	1	Location:	e da n z	0 - Ten /00	erine Embe	~
		X)UK	26	<u> </u>	ESTIG	THON	.			OF TSA / DV	TSIDE FENCE	
Coordin	12165:							Ortlling Contr	52.4M 52.4M	OLOGY		
	ke an E~:	Model	: A	TV W	10UNT			Depth Top of Rock 3Z	:	Depth Casing & Size: NA	Hole Size:	,
Elevation				· · · ·			m Vert. and	Buaring: (O ⁰)		Depth Bottom of Ho		
Water L	evet			Fluid A	Additives:	* 1.42	Date Star	t	Date	Finish:	Logger:	
*******		A			NA		2	119/99		2/19/99	N. BOSS	:
\top	1		SAMPLE		STANDARD				S	OIL DESCRIPTION		
DEPTH DEPTH BELOW	SURFACE	INTERWA.	TYPE & NUMBER	RECOVERY	TEST PRESULTS 6"-6"-6" (N)	SYMBOLIC	Color, M	toisture Content	, Relat	Particle Size Distril ive Density or Cons iCS Group Symbol		
p		D				FILL	او فا	vel (and be	41	(0-11)		
		3	OME- I	3/3	ДA		(1-5) Clay;	Silty CLAY; claups from	ible nsm	strand places	lettle selt	j Senge _ صاح
	7	3		. ,		OL				Temprossid		
5	8 8 MH mc sitty						5-85 21177 fra fra	to Hayay 5 to Horas ?; In	HT; day	ed bing slplace of day's no od 6-8'	; little clay; or ; FeOx of TROXONA SI	mootly sin 5 -
10	-	8	Cont. 3	5/5	N4		[85-4 Some co 310-22	t) CLAY; mo. lay; tr. vf: tuipabo; v	itted subm . shit	rd bin i H.gray J By : feld so F) damp; no schelandad	s high places of	7.51/5 weatha
کا ا	-	13	*	5/5			(14-26) sily cl	ΑΫ́ς	rd bing med p	Natur Ferrali las; some sel	ز≯ز
	-	18	Cme-		NA 		Some	elay's little	و کهما ما	org, salong 5 wel grantice	and sabando	<i>vd</i> "
20)—(((18 23	Ome-S	5/5	NA	دد	->	func-med	e tr		ant from p +0 20%)	_
25		23 28	9-3w	5/5	NA						COLMY TIL	- <u>ت</u>

MORRISON KNUDSEN CORPORATION ENVIRONMENTAL SERVICES GROUP

BOREHOLE LOG

Shee: Z of C
Project reumber:
WP-476, TASK 15
Hole Number
TSA1-8

)						T5A1-8
roject: T (s=	500	1001	- Z	NVESTI	GAT.	NW COLNER OF TSA (OUTSIDE FENCE)
, , , ,		AMPLE		STANDARD PENETRATION		SOIL DESCRIPTION
DEPTH BELOW SURFACE	MTERWAL	TYPE A NUMBER	RECOVERY	#197 #190LTS 6"-6"-6" (N)	SYMBOLIC LOG	Name, Gradation or Plasticity, Particle Size Distribution, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy, USCS Group Symbol
25	23				J	See po. 1 for description [CLAYTILL]
	28	OME-6	5 5	. NA		(26-32) Claying GRAVEL; while I High substand subsigning ; red-bin clay matrix; little viples fine ; volu
- - -	Z 8	۲-			GC	grant is chart ! to up to 3" mans; day; posted; grant is not weathered
-	3 7 .6	ome	45/	Na	LS	[Resident]
-						(32-32-5) Wenthered Cometary H. 5.4 (N6)351. fronteferency mod wenthered; finingramed; high personly high vene to Hell; mod hard
35 — -						Boring terminated & 32.5' bego due to refuse
, 				 		wom confirmed predock. Boring bookefulled W/ Bentente Sterry.
40 —						- Somples collected in and 2 1 1 2 2 1
-				<u> </u>		- Samples collected in gal 2 place 25. intervals as composites for mite PID head spore screening.
- محمد—	-					
-						
ST0-						
-						
-55-						<u> </u>



MORRISON KNUDSEN CORPORATION ENVIRONMENTAL SERVICES GROUP

BOREHOLE LOG

Project Number: WP-476, TASKIS Hole Number TSA 2-1

٩	utside fence)											
	cordinales	:			5347			Orlling Contractor: GEOTEZHNOLOGY				
	rill Make at	nd Mode	£		10UNT		Depti	Top of Rock:		pth Casing & Size: NA	Hole Size:	
E	lovebon:		4. 13	•			m Vers and Bear	ing: Depth Bottom of Hole:				
7	vater Level:	YA		Fluid &	Additives: NA		Date Start 2/16 /	199	ate Finis 之。	/18/99	Logger: ル・BOSS	
_			SAMPLE		STANDARD PENETRATION				SOL	DESCRIPTION	· · · · · · · · · · · · · · · · · · ·	
ELEWATION	DEPTH BELOW SURFACE	INTERWL	TYPE & NUMBER	RECOVERY	RESULTS 6"-6"-6" (N)	SYMBOLIC	Color, Moistu Soil Structure	re Content, R s, Mineralogy,	lelative , USCS	rticle Size Distrib Density or Consi Group Symbol	istency,	
	ا را ا ا را	3	Ome-1	43	Ή¢	a	SHIFF-V	ing; + W-	on gto	y Sord; tr-li	the roots damps filter	
	5 — · -	8	8mt-2	5/5	Ŋ₩	ML	14-7) Claye tr. ut sand from	y SILT; id ; damp-do	brnja ryjn	siplas litter o odors Fe.Ox E	clay; mostly selt; stam; locos?; Rorons 5:14] on play to selt;	
	10 —	13.	Cme-3	5/5	AA	CH	Seme elay	j tr uf sub.	~ "እ ክ	ig i feld som Te Dr nodule	eljushffjdampj	
	15 -	13	b-amo	5/5	МФ		grantic ,	illtlevt. pebsjv.s	gty;	l bin; med pl fild sand;	relview Native] (as; some sitt; — to hope wealter- socion; abundan	
	20-	18	eme-s	5/5	Й	ш		Eners :	-			
	25	21.5	ymé.	35/	NA	GC	(23.5-24.5) plus timo ; v weather ec	claying GRAN	4 زیمان دای ند جمد	goy graves; rd	bin matny; hille -) damp; y sorted; [Rasideum]	



MORRISON KNUDSEN CORPORATION **ENVIRONMENTAL SERVICES GROUP**

BORÉHOLE LOG

Project Number: WP-476, TASK 15 Hole Number

Westiside of TSA (outside ferce) Projecti INVESTIGATION TCE SOURCE STANDARD MEMETRATION SOIL DESCRIPTION SAMPLE TEST RESULTS SYMBOLIC **ELEVATION** Name, Gradation or Plasticity, Particle Size Distribution, RECOVERY DEPTH BELOW SURFACE INTERWA Color, Moisture Content, Relative Density or Consistency, 6"-6"-4" Soil Structure, Mineralogy, USCS Group Symbol (M) 35/ 35 See py 1 for description GC (Residence] NA. Bory terminated 265' bgs due to aiger / sompler referred upon impenetivable Roudeum Bory bolfelled w | ben toute slevery upon Samples collected in I god Zaploco \$2.5' intervals as composites for PID headspool 40

MORRISON KNUDSEN CORPORATION ENVIRONMENTAL SERVICES GROUP

BOREHOLE LOG

Project Number: WP-476, TASK 15 Hate Number

						<u> </u>		٠					Number 5A - 2 - 2	
F	roject: TCE :	SOUP	45	INV	ESTIG	tti ON	J		Location: W.sef 5	ide	ab 75A 1		vde fence)	
7	Cordinales	-	7 4	22.4/	2024	84	حري.		Drilling Contractor. GEOTEZHNOLOGY					
0	Inii Make III OME -	nd Model	l:		<u>7534.</u> 10UNT	<i></i>	<u> </u>	Сер	th Top of Plack:		Depth Casing & Siz			
F	levation:						rn Vert. and		ring.		Depth Bottom of	om al Hole:		
Ļ	Vater Level:	52	. 04		Additives:	VER	Oate Star	(<u>C</u>		Date F	nesh:	7.51 Logger:		
Ľ		YA.		<u>L</u>	NA		2	118	/99	<u> </u>	2/18/99 <u> </u>		N. Bass	
_			SAMPLE		PEMETRATION PEMETRATION TEST		· · · -			SC	L DESCRIPTION			
LEVATION	DEPTH BELOW SURFACE	MTERVAL	TYPE A NUMBER	ECOVERY	6"-6"-6" (N)	SYMBOLIC	Color, M	loisti	ure Content,	Relati	Particle Size Dis ve Density or Co CS Group Symb	XTSi8		
<u> </u>	()	0	- 2.	- E	<u> </u>	FILL	(0-3)	5.14	y CLAY & MI	Hed	ed bin . Hary	SW	phoplas little	
	-		1-3	4/4	MA		sut;	5 <i>m</i> ų	day, br.	y Lma	وكسمى يهتهولم	dan	p; still-ustill;	
	-	4	CME-1				13-65	5) (Yayay SIL	Ts rd	bin'sl. plan	; /u	the day; mostly	
	5 —	4		·	·	mL	St.H.D.Y	da	youdry;	# v mj /	F-Soral; NI ULU?	odo - o.	the day; mostly -	
	-		CME-2	5/5	ŅΆ		(6.5-14.5) CLAY; mottled rollin ! History; high plas; tr. self; motty clay; tr of subray - subroundate; feld sord; v. stiff; domp; no odor; MNOV steen;							
	-	9	3	-										
	10 -	,	m	5/5		래								
	-		me-	15	NA		<u>.</u>						_	
	-	14	3									Nat	ve Ferral Man]-	
	15 —	' '		5/_			(H.S-)	14.5) 5,14	CLM	j rd braje	ned ;	plas some sut	
	-	1	1 July 1	15	NA	! 	some	: c.(ays litt	اد م	ly feld so	ز <i>له</i>	4.9, mitic	
	-	19	8				Steen	۰ ر	י דיייביי	C 1990	ه ایمه و در در در در در در در در در در در در در	ازسا	abundant MNOx	
	20-	19												
	-	-	\ \	زے		cı							4	
	-	1] L	1/5	PFI		->51	<i>[-]</i> •	s/depH	, fee	isite		j	
•		24	3							'				
	25-	24	ME LO	3.5/35	NA	GiC	Se	٠.	P8 2 60	~duc	righten_	<u></u>	Residuum] —	



MORRISON KNUDSEN CORPORATION ENVIRONMENTAL SERVICES GROUP

BOREHOLE LOG

Sheet: Z of Z
Project Number:
WP-476, TASK IS
Hole Number
TSA-2-2

						13#-2
Project TCE SOURCE INVESTI						ON West side of TSA (outside bence)
<i>عب ر</i>			STANDARD	37117	SOIL DESCRIPTION	
	SAMPLE			PENETRATION TEST		
DEPTH SELOW SURFACE	INTERVAL	TYPE & NUMBER	RECOVERY	8"-6"-5" (N)	SYMBOLIC	Name, Gradation or Plasticity, Particle Size Distribution, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy, USCS Group Symbol
25	24	See See See See See See See See See See	35/35	AM	ଜୁ	(24-27.5) Clayey GRAVEZ; It gray-white gravel; rd bin clay motriv; little ples fins; v dense; gravel is sub-
]	2:15	<u></u>	 i			no odor ho damp; p sorted; weathered;
30 <u> </u>				ļ		[Reodeum]
_						Borny terminated a 275' bogs due semply
						auge refund upon imperetrable Resideum
35						Boring bockfilled w bentomte shorry .
-						upon completion.
_		 			:	Surples collected in I god 2 molos @ 2.5'
-						intervale as composites for PID head pour
40		}				
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45 —	1					
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50-	}				!	
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	∰ ڏ	IORRI NVIDO:	SON N	KNUDS	EN CORI	PORA	TION					Shee!	1 or Z
	-			Project Numb	e r:								
				Hole Number	<u>852)</u>								
P	70/0CI:	,						<u> </u>	Location:	•	·	<u> 1734-</u>	<u> 2-3</u>
1 a	ocidinal	- <u>C</u>	at ,	the.	Chem	<u>- Pl</u>	ant		Wiside	73	4, outsid	- Fance	offsor
Ŀ	<u>10</u> 4	166	7.71	N	7534	80.8	34E		Dritting Contr	Actor:	•		1251
10	TIN MAKE	and Mo	del:	_	· day		-	Dep	th Top of Rock	,	Depth Caping & Siz	: Hole Siz	æ:/
Ε	evation:	-		-	,		om Wegt, and	Bug.	5 <i>5/6/4 3</i>	\$44	Depth Bottom of	4/4	1814
W	alar Levi		56,	27 Burd	Additives:		estica	<u>√</u>			34′	Trickey.	
Ļ		<u></u> _				_	Date Start			Date Fi	nish: /445	10000	9-6
_		 	SAMPL 3.0	.E	STANDARD PENETRATION TEST	·					L DESCRIPTION		100174
ELEVATION	DEPTH BELOW SURFACE	INTERME	TYPE & NUMBER	RECOVERY	8"-6"-5" (NI)	SYMBOLIC		XXII	M9 Content.	Heletin	Particle Size Dis re Density or Co S Group Symbo	noietavru	- · · · · · · · · · · · · · · · · · · ·
ľ	•	.0	CMF	-			1		. ,		dark bro	wn,	سمسي
-	-	$\frac{1}{2}$	17			i	0090		. e_\$	HO	est 144	•	
١	-	-	*	5.0		<u> </u>	E L	. /4	4/00	•	_	10.00	Eroum
1	-		Ì			ĺ	and	6	lans	7	ottled o stiff, s LVIEW	- L	ONed
-	5 -	510			-		ule		FER	200	LVIEW	CLAY	,
1	_	-	CHE	1			ļ					•	
	-	-	2	50			as	a	bore,	Mad	usive, stiff	Come Fe	04
Į	-	i	Ì		Ì		MAL) /	rodule	5/6	1. Stiff	(3.0).	
	-	١. ،	ļ. 			.							_
1	10-	60	00	├—	4	_							
1	-	10.0	CME 3	ļ ·					. •	,		, ,	11
	-		3	5.0	i	ļ	Mo.	s.f	4 /19	ut i	910,5/	CKC4 Si	des -
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r		200	Bus			Į.	Stream	Ł	5-4.5,	riff	gone CL	Ay 77.	44
	7		200	ا/ر م	ļ	{				- •	• -	/	4
	٦	Į	₽ }.	5,0	İ	ļ							_
	7		-	1	j				/	,	, ,	<i>(</i> .	ہر
,		25.0					at	Z	3.5.	26	endant,	fine 9	ravel t
	2						an	7 4	lar 1	//Me	s tone		



MORRISON KNUDSEN CORPORATION ENVIRONMENTAL SERVICES GROUP

BOREHOLE LOG

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-			SAMPL	E	STANDARD PENETRATION		SOIL DESCRIPTION OF THE MER
ELEMITON	DEPTH BELOW SURFACE	INTERM	TYPE & MUMBER	RECOVERY	TEST PERALTS 6"-8"-6" (N)	SYMBOLIC LOG	Name, Gradation or Plasticity, Particle Size Distribution, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy, USCS Group Symbol
	-	2570	CME	40			Coravel with Fat clay, gravel Heathered and Soft Clay craye brown gravel light gray. CLAYTILL
		م.و <u>د</u>			∠ 05S	-	CLAYTILL
	30-		CME 7	17.40 i		•	As above -
	-	340			4055		
	- 28						T.D. 34', auger refusal' _
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	₩	ORRI	SON K	KNUDS	EN COR	ORA	TION				
	- EN	IVIRON	MENTA	NL SERV	ICES GROU	JP _.	OLE LOG			Sheet	,
ļ	Decile de la			<u> </u>			•			Hole Number	
ľ	1CE		4 H	e C	hem.	Pla	Location:	LTSA.	outside		-2 -4
	104 Prili Maka e	141	<u>9.5</u>	9 N	7534	<i>183.</i>	70 E Geo	mriciar. Kehn	0 1094	7	~4
	CME Sevenion:				Au ge		Copple Top of R	57.5	epth Casing & Size:	Hole S	1/8/4"
L	aler Level	<u> </u>	<u> </u>		Additives:		om Verl and Bearing:		Depth Bottom of F	-/	7
L			SAMPL		STANDARO	, .	Date Start 1025 2/4/99		1/99	Logger A.	Benter
WITON	PACE FACE	WTERW.	1	ECOVERY	PERETRATION TEST PRODUCTS	gre Qre	Name, Gradation or F Cotor, Moisture Conte Soll Structure, Adinas	Plasticity Pa	DESCRIPTION Irticle Size Distri	ib. 41.	
ELE.	SEE SEE	₩ ₩	TYPE 4 NUMBER	A S	(N)	SYMBOL	Soll Structure, Minera	logy, USCS	Group Symbol	sistency,	
	7	,	CME				have clay (C)	<u>~), &</u>	FILL SON	es 100	2 to 16 . 2 + 1
			'	5.0		•	mercaie G	reve/	ay 31, A	lark b	rown,
	- +	_				-	Lean Clay (<u> </u>	atte 1		3.5' -
1	5	<u>5.0</u> 5.0	CHÉ				Lean Clay (C light brown lodales - L	dark	Brown	sowa Some	70
]	İ	2	5.0		ĺ	as above	(2	oxanae.	in Rec.	4
	1						Fat Clay (C)	4) 40.	HI and D		8
	10-	10-0	اير .				Fat Clay (Clay (Clay (2.0)	my, M	onety st.	1/4	V=79 -
			3								
	-			5.0			CH as a Some si	rborc Ickans	- Messi	FOR	nodale +
	- 	اه.2			ĺ					,	
ľ	- 7/2	م مک	HE				Oredon was	fle 1	all or	. بو	-
l	-	- 1	4 4	5.0		ſ	fredom ma	ecomin	of sandly		
	1	-					at 19.5'-1				
Ä	B - 12	00	2	 -			+ + + + + + + + + + + + + + + + + + +		,	· - •	_
	Ţ	۲	34E 3	5.a							7
	4				-		at Clay with	الصبيع	(cu)	150/	22.5
25	<u>, </u>	ca l		-	}		rown, light	ffled	yellow	Srown	to a range
_					<u> </u>		round light	w ro win	, some M	n0,0	CAY 7746

BOREHOLE LOG

Since: 2 of 2 Project Number:

Hole Number

	Project					<u> </u>		754-2-4	
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				SAMPL		STANDARD PENETRATION		SOIL DESCRIPTION	<u>~</u>
iei Ewitine	DEPT.	SUPPACE	INTERNAL	TYPE & NUMBER	RECOVERY	RESULTS 6"-6"-6" (N)	SYMBOLIC	Name, Gradation or PlasScity, Particle Size Distribution, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy, USCS Group Symbol	
		1	250	CME 6	改	75A-2-4 26:0-27	2	marcase in gravel.	-
	30	, - ,	200 30.00	CHE	├	LOS 5	7		-
		1		7	2%	30-0-325		fat clay with angular likes fore gravet up to 2%; some chert.	1
	35	<u> </u>	35 <u>.0</u>	CME		40 55		Clay orange brown CLAY TILL;	_
)		<u> </u>	37.5	8	2/2			As above, predominantly yellow brown, Probable residuem T.D. 37.5' auger refused	- - -
		-	ě					1410 2/4/9 . Probables bedrock Hole beek fulled	, _
		1						with Grout Well bentonite	-
	-		1					_	<u> </u>
						1		. '	-
	 	<u> </u>		į				_	-
		1							1
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EN	URHI (VIRO)	NMENTA	L SERV	EN CORI	PORA UP	TION				Sheet Project N	or
				BO	REH	OLE LOG					£852
roject:		p W	01		. 7		Location:			75/	4-3-
oordinate	6:	TAL	100	m. Pla	est		nt sid	e Fena	E, Wish	4751	9-04/50
104	141	1.8	5N	7534	80.	. 1	Drilling Contr	TOTOL:	-	~15	West
HI Make s	Ind Mo.	get: _/_ (- 7.	eger			Top of Rock		Oth Casing & Siz	ne: The	e Size:
levation;	_		- 22	401	14274	1~	30			4	14/87
	52	-11	_	_ ;		om Vert and Bean	NG:		Depth Bottom o	f Hole:	
Anter Lievel	i:		Fluid &	Additives:	· · ·	Date Start: 2/5	3/5	Date Fines	10915	Logoe	
	Ţ	SAMPLI	<u> </u> F	STAMBARD		2/4/99		2/4/	99	72	. Bent
ĺ.	<u> </u>	30	_	PENETRATION	ŀ			SOIL:	DESCRIPTION		"
DEPTH BELOW SURFAC	OWTERWAL	TYPEA	RECOVERY	6"-6"-6" (N)	SYMBOLIC	Name, Gradat Color, Moisture Soil Structure,		MAIDHLE !	1 1 m m m m m m m m m m m m m m m m m m		
1	_	CME	ار			Lean Cl	7.	lark i	brown.	Some	organ
4]/	[ص			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		727			
		1 1		i							
آ بر	5.0										
	Fio	1200									
٦		ME	ļ		i	1-21 1-			,		60
Ŧ		2	ሳ	ĺ		6-7', Les Fe 04 M	444 (*) 40 (*)	7, a	ene gray	de	ndans
		i	5.0]	i	26 5 /	70 no	Carley Con	A.	roly	ndans en C
4		[ŀ	7- Fato	may ((44)			
12-1	10.0		1		ĺ	brown, Very sty	1.9 40	200	T. HIM		O NOU
4	5.6	7			.	Very Sty	4 (3.	.0) (Ferrel	Wesn	
٦	f	ME			ſ	, ,		-			
┪		ヺ	501		ļ						
-	ĺ		1.0	1				_	1	,	
4						Miner	grav	cla	4 14		
بر	<u>5-0</u>	<u> </u>		- 1	[•	1	1.01		
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4	ĺ			- 1							
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n_12	أمه	ļ		İ		,					
2	.0	net!		·	+	m. 1 m. 1.	7		-73	-	
7	K	AL		ĺ		Fat Clay growal f very sti	CH	-/5	70 Say	₹ <i>≠</i> , /	_ سعم
\dashv	- 1	5	ſ	1	' <u>'</u>	your of	9000	ue 010 v	WAI DI	act,	14001
4	- [-	ł		ł	very st	11	LLA	9 712	٠ ــــ	
		}		- 1		at 23' A	405+0	7 910	y of the	tack	
L							ŕ	/ 1	•		



BOREHOLE LOG

Hole Number

<u>-</u> از	vilant-						73A-3-1						
P 1	rojecti: 7C i	Ea	+ +	60	hem	Plant W. Side TSA · Outside Feare							
			SAMPLE		STANDARD PENETRATION		SOIL DESCRIPTION						
ELEVATION	DEPTH BELOW SURFACE	INTERNAL	TYPES	лесомену	TEST #884ATS 6"-6"-6" (N)	SYMBOL C	Name, Gradation or Plasticity, Particle Size Distribution, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy, USCS Group Symbol						
		25.0	CMÉ 6	40'			Sand - yellow brown, black, light - Clay (gravel) , Graves is angular Innestone						
	- 	<u>30.0</u>				-	CLAYTILL.						
	• 1						7.0.30.0' suger Refusal 0915						
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MORRISON KNUDSEN CORPORATION ENVIRONMENTAL SERVICES GROUP
BOREHOLE LOG

Sheet _	_/	_ 61 _	<u> </u>
Project A	umber. S.E.	<u> </u>	2
1999	mber	7.	7

											7	SA-	3	5
		et y	He C	ham	Pla	+	/	eation: U.S. id.	e T	TS.A		- - - · ·		
oordinates		1.03	N	75342	20.2	7 <i>E</i>	D	rilling Cont	ractor:	10/09	4			
rji Make a	ind Mode	il;	, _	وسم			Depth	top of Floor	32	Depth Casing f		Hole St	4/	374
evation:	62			7	Angle fro	m Vert. ar			- .	Depth Sono	am of H	<u></u>	-/	7.
ater Level		7	Fluid &	Additives:	. <u>v</u>	Date Sta	n: 16	35-	Date F	inish: /6/5		Logger	1	
	1	SAMPLE	_ 	EIMONO	T	2/1	<u> 199</u>	<u> </u>	2/0	/99 DIL DESCRIPTI		Hol	<u>5</u>	/e /
DEPTH BELOW SURFACE	INTERVAL	TYPE & NUMBER	RECOVERY	PERETRATION TEST RESURTS 6"-6"-6" (N)	SYMBOLIC	Color, I	Moisture	Conten	t, Relat	Particle Size ive Density o CS Group S)	r Cons	bution, sistency,		
-	ō	CME 1	5.0			101	ive	clay	کر سر	proist	216	Fiff FIL	1110 	14.76
<u>-</u> -2	<u>50</u>	CHE			-									.6
-		2	5.0			Der.	got /	gut	r ja	Mottle 20 Mod 2ELVIE 100 , I	E W.	CLA	24 24	/
<i>10</i> —	10.0	CME 3	5.0			2	، کسا	a bo c	ر ے ر	sticke		Tal		
سىرر	15. 15.0				<u> </u>								. ,	W. 3
- -		CME 4	5.0			90	ניאמי דייך	M some	61	ded you	(E110) U 120	d d, w brown of, He	Lin	•
20-	20.0	CHE 5	50'			at	•	.5/-		icase		grav	el :	ر ترسیع
25-	250													•



BOREHOLE LOG

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	72	E a	++	he C	hen,	Pl	ent inside TSA .
	_		SAMPLE		STANDARD PENETHATION		SOIL DESCRIPTION
ELEWION	DEPTH BELOW BURFACE	INTERVAL	TYPE & NUMBER	MECOVERY	TEST RESOULTO 6"-6"-6" (N)	SYMBOLLC	Name, Gradation or Ptasticity, Particle Size Distribution, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy, USCS Group Symbol
	- -	30.0	CME (g	<i>5.0</i>		_	at 30, " the clayer fine said lease v. moist lease lea
	-	30.0	CME	20			abundant MAO, molet, dense
		320	7				Probable Residuan
							Tib. 32." refacel 1615 214 199 hole growted with Guard Well bentomite
	-						

	(C) N	IORRIS	SON KI	NUDS	EN CORP	ORAT	ION	-			She		1068	_
	E	NVIRON	MENTAL	. SERVI	ICES GROU		N = 1 4				Pro	ect Number	a>	<u></u>
					БОІ	TEN	OLE LO	JG			Hol	a Number		~
)	Project:	۔ سےرہ	+ L	/	Chem	. D	6 at	Locatio	n:	<u> </u>		<u> </u>		
Ì	Coordinat	95:						Driffing	Contractor:	<u>A (20</u>		E, Mo	yed v	3
	Drill Make	and Mod	a):	/ N	7535	<u>. S.S.</u>	.52k	Depth Top of	Rock	Depth Casing	& Size:	Hole Size:	/	_
7	Elevation:	F-	ZS_ 5-0		 .	Angle to	om Vert, and	142.	<u> </u>	Depth Son	om of Hole	+14	1814"	_
ŀ	Water Lev		3.0	Fluid &	Additives:		ertic		3		42	-5-1		_
L		11.				,	2/0	199	2/8/	inish: 1400 199		7. B	n fer	-
2		,	SAMPLE 3.0 "	1	STANDARD PENETRATION TEST	ì	 		\$	OIL DESCRIPTI	ION			
ELEWATION	DEPTH BELOW SURFACE	INTERVAL	TYPE &	RECOVERY	6*-6*-6* (N)	SYMBOLIC LOG	Cotor, M	koisture Cor	ntent, Reiat	Particte Size ive Density o CS Group Sy	r Consis	tion, itency,		
_		0	CHE			1	Lea	clay(ach.	40ffle.	dor	ر مرسم	ട്ടുഗ	
				3%			and	light.	prous	Mottle. n, Mo . Rew	st	ر کم نے کرا	H_{I} :	_
] .	4	<i>[/</i>	10			fra	ce q	ravel	- Ken	FIL	n ren	rei vre	7
		١,	1					-			ے ہے۔			
	5-	500	20.00		·	 -	,	-	- '	4			_	4
		-	CME	}			<u> </u>		line.	nmu.	Low	u 91	avel.	4
•]	2	50			- plas	ctil a	,,,,,	, has b	FIL	٠ ٔ		+
] _{e-}									•.			٦
	10-	10-0	<u> </u>	٠٠٠ - ١	·]								٦
	,	- 0-0	ME	-						_			_	bracket
	1		3	56		-	i 			<u> </u>			12.0	
		7					Lea	مدات سد مکار ماه صد	7 CL	1914	بر محدی	cendar		4
	,,,	150					Feo	node	les, 1	lisist	stof	<i>-</i>		┥
	S -	15-0	CME						•			Ferrel	view-	┨
		<u> </u>	4	50		 	٠,		u lin	44900	n. 4	EO, H	CM	1
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	20 -	200	02.6			-	ر سو	<u> </u>		era can	1 4	Z(Z)	<u>20' </u>	┽
		-,	CHE				FRA	elita	, ~ 10°	10 Sam	701	6 row	7,	┨
	'			5.0'			900	tes	ist.	d oran	f			┨
,							ad	23"	Mos	+14.11	ght	gray	•	1
•	25_	25.0			··-					, .			TILL	1



BOREHOLE LOG

) <u>}</u>	Protect						
Ĺ	TCE	at	14	6 4	hem . 1	Plan	ent. Inside TSA
_		<u> </u>	SAMPL	<u> </u>	PRETRATION		SOIL DESCRIPTION
ELEWITON	DEPTH BELOW SURFACE	INTERNAL	TYPE 4 NUMBER	RECOVERY	TEST RESEARTS 6"-5"-6" (N)	SYMBOLIC	Soil Structure, Mineralogy, USCS Group Symbol
		25.0	CME G	50			Increase in gravel content
	30 -	30.0	<u> </u>	-			at 29: honey gravel
	- -	,	CHE 7	50			Pat Clay (CN) occasional graves, praye brown and black, Moist, Stiff
	- -						at 33.5' - CH, light gray with indur- ated clay fragments (unusual).
		35.0	CHE		<u> </u>		damp day gravel -
)	- -		B	3.5			·
	_	400	CME				Clay with gravel, light gray and orange brown probably CLAY TILL
		42.9	9				Fet Clay(CN) with Chart quest, reddich brown possibly Residuum
					j	.	T. D. 42.5' Refusal on bedrock
	- - -				Ì		Hole back filled with benton
	-	.				İ	1tc
	-						
	4						
' [

			<u>, </u>									
į	©	MORR	ISON K	(NUD!	SEN CORI	PORAT	TION	··				2
							OLE LO	G			Project Number: Task 85 Hole Number	<u>ح</u>
	Project: 7 C	Ea	+ +1	é C	hem.	Pla	ut	Location:	rner	TSA · Out	ide fence .	4 <u>-</u> o f f
	104 Drill Mai	//32	8.00	N	7534	183	.40	Drilling Cons 200 A Depth Top of Roc	<i>Q</i>	o Lo 9 Y	: Hole Size: /	- 28
ı	Élevatio	a: .	57.0			Angle in	OTH WORL BUTG!	BOLING:	7	Depth Bottom of	444 / 87	4
Ì	Weter L		- 40 C		å Additives:	Ye	Date Start	1400		37 sh: 1530	Logger: A	_
	T		SAMPL	<u> </u>	STANDARD		E/3/	? 7	2/3/ 80#	99 DESCRIPTION	Hibent	4
ELEVATION	DEPTH GELOW		TYPE & NUMBER	RECOVERY	FEST MESULTS 6"-6"-6" (N)	SYMBOLIC	/ COIDT, MO	isture Content	i. Relative	article Size Distr Density or Cor Group Symbo	Wistone	
		-	CHE /	5.0	75A A-4 0-25 TSA-A4		KC41. 1	tay with	21.0	derk b	restanciones	ure f
	5-	5.0			25-50		o rang	relation	in, F	co Mail	Atbrown, 9	7
•		12:0	CNE	50	75A-4-4 510-7.5'		Mas	sty ligh	62.5 64 90	(Roka	elview.	-
					75.4 A. 7.5 70.0		Most	fly or	ag e	brown	•	-
	10-	10-0	CME		TSA -A - 100-12-5	e †				·	brown a ff (3.0).	
		 	3	ヒハリ	73 A · A-	,	وسومك	e Slick	~~	las		_
) /	150		<u> </u>	12.5 VE.3	İ	Abon	rdent 1	E0,	rodules	12-14'.	
	_	15.0	CME L/		73A-A-4 5.0-17.5		CH	Hotel	ed 1	eddick back Co	Grown,	-
		 			75.A-A-		at	17°, Ser	***_ **	Albert Liber	metome gra and, white	ر رمد: م
	2o-	200	CHE		BA A-4	-	10mg	er Fai	relu	vew.	21.	
	,		اسح	-]	200-22.		Fat C yellow	lay wit	4 91	evel, up	to 2,4 (C.4)	
	- کځ	250		\$	TJA · A-4 2.5-25 L	,	gray.	Line S	and	Clay	Till	" "



BOREHOLE LOG

	70ia-1							TSA-3-4
	70jeci: 73	A	+		P/	ant	SW Corner TSA.	
			SAMPL	£	STANGARD PEKETRANON		SOIL DESCRIPTION	
ELEWINON	DEPTH BELOW SURFACE	INTERVAL	TYPE A MUNABER	PECOVERY	6"-6"-6" (N)	SYMBOLIC		n aistenc y, Il
i	-	\$55.0	CHE	50	73A-A-9 25.0'-27	,	buffi damp, very stiff	fore graves, (PP=2.5) 275
	_ _	240			73 A · A · 1 275 - 70 · 4	•		
4	<i>7</i> 0 —	36- ()		 -	<u> </u>	ļ		. It will -
	1	•	CALE 7	5.0			Mostly yellow brown, A angular lines form and possibly	chert gravel. Ecsidaum
							saturated = 33'-34',	:
4	25-	35 <u>0</u>	4		· <u></u> ·	ļ. !	cample refusal	_
			auga					•
	-	1					bedrock 1530 Z	13-199 -
	-			.	·		growted hole with	grout - Welt
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BOREHOLE LOG

Project Number:

Hole Number

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1	Project:	. سیر	وعجواه	the.	Chem	E	Luck	الم السم	ocation: USIXV	-	A , Sau	. 46	فيدريد	/	
t	Coordinates	:						0	rijing Contra		~ ,		Capaci		
ŀ	/04	1136	3.8	<u>7N</u>	<u> 7536</u>	46.	26 <i>E</i>				0/094	<u> </u>	· 		
Į	CME	- 7	5	f.s.	lug	سم	•		Top of Rock		epth Casing & :	SLES:	Hole Si	il /8	14"
ſ	Elevation:	سے پر ز	43		•		m Vert und		9:		Depth Bottom		,	6	
ŀ	Water Level		<u> </u>	Fluid &	Additives:	<u>.K</u>	Date Star		<u></u>	Date Fin	<u> </u>		Logger.	7)	$\overline{}$
L			SAMPLE		STANDARD		2	14/	29	2/0		<u> </u>	4.	<u> </u>	100
	.]		300	_	PENETRATION THET										
Š	± 20	18	5	rEAY	RESULTS	BOLIC					article Size 6 e Density of 1				
3	SURF	WTER	TYPE	ECOVERY	(N)	SYMB					S Group Syn		aconicy,		
=	086	0		Œ		₩ <u>J</u>	4.4	- 4	<u> </u>			4 /	2 -/200	nect	\sim
	/-		CHE				Zdani l	Jay .	را (ساع)	iosm	y day	7	2.7/	-	
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	1/7					•			,		, ,	-	75 4		, ,



BOREHOLE LOG

Shee: 2 of 2
Project Number:
Hole Number

١,	Brain-			·	 -		154-25-3-5
ľ	70	Ea	+H	<u>le 0</u>	STAMBARD	Dla	at inside TSA - South and
	1		SAMPL		STANDARD PEKETRATION		SOIL DESCRIPTION
PELEWINON	DEPTH BELOW SURFACE	INTERVAL	TYPE & MUMBER	RECOVERY	TEST WESTATS 5"-6"-6" (Nt)	SYMBOLIC	Name, Gradation or Plasticity, Particle Size Distribution, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy, USCS Group Symbol
	30	30.0	6	50			fat Clay (th) - 150% said (10%) from prol; substract yel. orn, light graf! Some black (440). Moist vistiff: 18crease in gravel, up to 2". At 29.5 aboutent 440 - black aboutent gravel, light from to white. Maybe Residuan T.O. 31.5' 1500 2/6/99 Refusal Hole growted with Grout Well bentonite
		1	1			[

1			<u> </u>	***							T	
1	w '	MUHH ENVIRC	NWENT	KNUD! 'AL SER'	SEN COR VICES GRO	PORA UP	TION	<i>y</i>	in 13	ess/er	Sheel	<u>ے ہو</u> _
1							OLE LO	og dn		اسا و دو در	Project Number	
L					_						Hole Number	
·	Ргојест: 771	<i>.</i>	44	6.1	ken Pi	(<i>_</i>	Location			T <u>SA - </u>	
Ī	-conding	Nes:		-				/ساکی Drilling C	CO / Nas	tide ,	<u> Cense</u>	
ŀ	Orill Make	124	ر <u>ک</u>	4/N	7535	37.		Geo	Keka	1094		
L	<u>CM</u>	<u>E -</u>		<u> 4.,</u>	S. Aug			Depth Top of F	iocic >	Depth Casing & Size	Hole Size:	84
Ľ	invalion:		60.	85'	•	Angle to	TOTH VOTE ONC	1 Beering:		Depth Sottom of	Hole:	<u> </u>
ľ	Valer Lav	rei:		Fluid	& Additives:		Date Stan	0255	Date F		Logger:	
٦	_		SAMP	<u></u>	STANDARD		2/3/	99		L DESCRIPTION	4.	Ben f
₹	』 ا	,	3.0	1	PENETRATION TEST MEDULTS	<u>.</u>	Nama C	Sandation and				·
Ž	£82	1	48.6	ECOVERY	5"-6"-6"	≨			ant Halata	Particle Size Distr ve Density or Cor	aniata na s	
<u>a</u>	<u>888</u>	1 2	F.5	<u> </u>	Sem \$100 5	100 M	Soil Stru	Cture, Miner	alogy, USC	S Group Symbo	1	
	1	10	CHE	٠ .	TSA-3-1	/	0-1.0	o - Lea.	- Clay	with In	estone	movet,
	2	1 ·	1	35	,		January 1	A	W -16	. TDASMI	` <i>^</i>	
	3	4			TSA-3-1	,	and I	in the s	מעומ	with	~Zgm	71
	4.	415	-	ĺ			Mino,	100	of M	with di mo, more	مری بهرعو	44 62.8
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		-	CME		75A-3-2	\$						-
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١	-	9.5				j .	Fet	clay, Co	24	Undella Da		8.5°
1	10-	9.5	CME	.	75A-3-3]			_	iner AIN	0,4.5	44
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	_	سرمد [-		34 3.4							, -
	20 —	19.5	ME	 	75A-3-5	.	. غوير	20' 11	ith.	line hai	84 - Lunius - S	·
ľ			7			i	grav	el and	Rugo	fine line	d white	٤, -
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ļ			[[þ	30-7-5	1		- · · · · · · · · · · · · · · · · · · ·		,	-	-
	4	24.0										<u> </u>
1	<	24.5	- -		——- j	. -	<u> </u>			· · · · · · · · · · · · · · · · · · ·		24.51

10.73	M
10.55	m
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BOREHOLE LOG

Shoe: 2 of 2
Project Number:
7858 852

TCE at the Chem SW corner To SAMPLE STANDARD PEKETRATION SOIL DESCRIPTION TEST RESULTS RECOVERY Name, Gradation or Plasticity, Particle Size Distribution, Color, Moisture Content, Relative Density or Consistency, 6"-6"-6" Soil Structure, Mineralogy, USCS Group Symbol (M) CME Stone gradel, (CL), scalize about MA. Yellow brown black, scoret CLAY TILL 295 1300 2/3/99 growted hole with 3,50

BOREHOLE LOG

Project Number: WP-47lo, TASKIS Hole Number

·L													TSA 3-7	
ľ	roject						1		Locations Sev Co	a alua	0E 75/	4 (outside fear	<u>~ \ \ </u>
ŀ	Coordinates		20	۷۷۰میلی	ESTIM	7) 101		-	Drilling Contra		. <u> </u>	, ,,	2013020	
			301	1. 2	53645	<u> 22 ب</u>	3E		GEOTEZHNOLOGY					
ľ	Orill Make at			TV W	10UNT			Dept	pth Top of Rock: Depth Casing & Siz 37 NA			èd:	Hole Size: 8.5"	
Ī	Elevation:	64.5	; 4 ′				011 Vans, aux 1762/11	600 (C			Depth Bottom o	4 Haie: 2		
ļ	Mater Level:			Fluid &	Additives:	•	Dare Star	·/	199	Date Fire	177/99	L	N. Bass	
L	''	VA.	SAMPLE	<u> </u>	NA STANDARO	1		1/7	177		DESCRIPTION	ŧ	Ni Stas	
_	.]		<u> </u>		PENETRATION	١								
ELEVATION	DEPTH BELOW SURFACE	INTERVAL	TYPE 4 NUMBER	RECOVERY	6"-6"-6" (N)	SYMBOLIC	Color, M	laist	ire Content,	Relative	article Size Dis Density or Co Group Symb	onsist		
_	7 -	0		c/		OL	dampj.	him	is org oder	5 *** t	ty sound;	1006	ild; somela 1; CTOPSO	ال الماد
		5	CME-1	% **	NΑ	mL	12-73 Silts t trans	r) fry loca	layey 510 food; d d?; fish	T; rd sup-d ile;	bin; siple by; no ode abundand	oj lu Wjf Fe0	ette chay; i e Ox stain; k noda	rostly - -
•	-	5"	2.	5/5		///-						_	'Roxam Sil	- €] -
	10 —	10	CME-2		NA		たらむ	tj =	smeclay;	70 vf	subang qt	4/	jhugh plac fild sand; i	re
	-	10	Ň	5/5-			V. Wee	7.4	ranit	iipe	ע shft אמעל ב מ	کھ ز'	2000 ; gua	lorj _ -
	-	ıċ	CME		NA	C#		•						-
	-	20	Cme-4	5/5	NA							Na	hre Fermlun	- - w]_
	20-	20	CME-S	5/5	NA	દા	(20-2 Same e MNOx	lay,	ittle va	gto	rd brn; m , subang s granutii	pe	las; some 31 j abundant bo; firm CLAY TILL	/ - - -



BOREHOLE LOG

Project Number: WP-476, TASK 15

								7543-7
	Proje							Location:
		TCE	<i>5</i> ⊅.	urce	I	NUESTI	GATI	
				SAMPLE		STANDARD PENETRATION		SOIL DESCRIPTION
	DEPTH	BELOW SURFACE	HTERML	TYPE A NUMBER	RECOVERY	#EST #ESULTS 6"-6"-4" (24)	SYMBOLIC	Name, Gradation or Plasticity, Particle Size Distribution, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy, USCS Group Symbol
-	Z-		25				el	See ps. 1 for description [CUAY TILL] -
	3		30 30	0me-6	<i>5</i> 45	μ ά		(26.5.37) Clayer GRAVEL; Higry-whitegravel; - rd bin-rd claymatry; little plas fine; vidence; - growel is subary chert; lo; clamp; p. sorted; - weathered; no odor
		-	20	6-7	5/5	M4	GC	
	3:	- -	35 35	5	217.			- clay matrix grades to 1+gray ! > to 50%
		_	37	CANC.	112	NA	<u> </u>	[Resident]
	4.	- - -				Į.		Borny termination 37 beg due to sompley /- ouger refund upon suspentiel bedrock.
		-						Borns bockfelled w/ bentonite sturry upon
	4.	- - -						Suples collected in 1 gol Zp (ors \$2.5" unter sole so composite for PD headspece
		 -						anelysia
	\$	о <u> </u>	1					- -
		- - 	<u> </u>					

MO ENV	RRIS	ON KI MENTAL	NUDSI . SERVI	EN CORF	JP	1		neer ol _2			
<u>.</u>					HEML	LE LOG			-	•	<u>/ 23 </u>
TCI	c a	t H	C	rem i	Plant inside the TSA.						**
04/3	١٤/٠	<u>031</u>	/ 7.	53700	8. 15		Drilling Contra CT CO FC	for 1	59 / opti Casing		Hole -5
ME vation:	- Z	5 4	<u>. کید</u>	augei	/	om Vert, and Ber	31'+			_	444 87
<i>&</i>	66,	<u> 6. 9</u>		<u>, </u>		rtical	-		Depth Son	3/ 3/	ia :
er Level:	•		Fluid &	Additives:		Date Start: [/]	15	Date Fine	1989		A. Ben
$\neg \neg$		SAMPLE 2 - //	1	PENETRATION	•	, , ,		SOIL	DESCRIPTI	ION	
DEPTH BELOW SURFACE	INTERWÁL	TYPE & S	RECOVERY	#ESULTS 6"-6"-6" (N)	SYMBOLIC LOG	Color, Moist Soil Structu	tation or Plas ure Content, re, Mineralog	Relative y, USCS	Density of Group Sy	r Consi /mbol	istency,
- - - -	50	CHE	5.0			dught Mois at	clay C f brook f, stif 2.5', o	L) w f. E lark	offle lithe Evort brow E	ed of the	orange br O Nodule Ferrelvie Olive gr
50 CHE 2 5.6						1. 16 h					7.5
	10,0					brown	1 Stiff				sty light of Feb frien Cl
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-		_	5.0	·		J 110 KT	4 rays	usis	FA . F.	ر 0 ء	rage brown
5- <u>+</u>	2:0 2:0	CME	•	<u>. </u>	+	Massi	ve, mi	- -	. K. S.	H	Ferrellie
-	:	مدا	5.0			at i	B', He	stile	l re	dolar cad	LA O.
7	Zo. 0					ars d Sand					wn trac
اسا ا					1						

Lower Ferrelview

BOREHOLE LOG

Shee: Z of Z
Project Number:
This BSZ
Hole Number
TSA - 3-8

								•		Hole Number	
P	roject:		/ /			D	L	Location:		75A-3.	<u> </u>
L	112	- 2	<i>← ≁:</i> Sampli	<u> </u>	FRANDARD	Pla	ent.	Inside TSA	, sout	<u>Lend</u>	
ELEWATION	DEPTH BELOW SURFACE	INTERNAL	TYPE 4 NUMBER	PECOVERY	PRINTING YEST RESULTS 5"-6"-6" (N)	SYMBOLIC	Color, Mors	dation or Plasticity, Patture Content, Relative ure, Mineralogy, USCS	rticle Size Dist	tribution,	
	-	26.0	CHE 6	50'	,		Fat Co Soud, Some, 29430	lay (CH), MI Moffeed yell light gody,	nor are nonet,	wal, = 10% wa, black, V. Staff, LAy TILL	
ļ		20.0					[•		,	7
		31.0	CHE					very , light ,			
	40 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -						Refus. Till to	Probable po Him le feet file e II banfo	y Not a	199 Augented rock, Co	

MORRIS	ON KNUDSEN CORF	PORATION
		REHOLE LOG
Project: TCF at Coordinates:	the Chem Pl	ant
Onli Make and Model	5 11.5. ang	Depth '4
		Angle from Vert, and Bearin
Water Level:	Fluid & Additives:	Date Start 120 2/11/9

Sheet _____ of _

Project Number:

Table Section

Hole Number:

d,	Provencii .						· <u> </u>				752	<u> </u>	`
7	TČE	at	the	- CS	en Pla	rat	-	Location:	. .	A NE			一
7	Coordinate	s:			C-121 1 64	- pr (Drilling_Contr		/ - /\		<u> </u>	
-	Orill Make .		<u> </u>		<u> </u>			Gea			[
Ĺ	CMB	MOG	م کدح	11.5	. ang	_	Depth Top of Rock: Depth Casing & Size					Size: 4"/8/4"	<i>y</i>
ľ	Sevation:				7	Angle in	Angle from Vert, and Bearing: Depth Bostom of					1/0/4	⊣
ķ	Vater Leve	t.		Fiuid &	Additives:		Date Start 12010 Date Finish: 0920						
L		- 	*****		one_	,		199	2/	12/99	7	Benz	Æ,
_			SAMPL	<u>-</u>	STANDARD PEMETRATION TEST		<u> </u>	<u>•</u>	SOIL	DESCRIPTION			\Box
ş		4		È.	RESULTS	음	Name, (Gradation or Pla	sticity, Pr	article Size Dist	tribution.		- 1
*	DEPTH BELOW SURFAC	NTERVAL	TYPE & NUMBER	PECOVERY	6*-6*-6*	8	Color, M	loisture Content,	. Relative	Density or Co	nsistency.	•	- 1
프	공품공		걸	E	(N)	848 F0G	Q011 Q11 Q	cture, Mineralo	gy, OSC:	a Group Sympt	Я]
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			1	50					_	C			7
		l	1	3.0			Rev	wreed f	erre	I VIEW :	Fill	•	+
		ļ		. .				: -		•	7	4.0	4
	' ۔ ا	5.0						- clay (c	11: 4	cel La	· Acres		
	کا	5.0	4.46				معتصدی در سر	ری وسور در در	سرارات	05/10	Kard C	Brown	,
	[-		عامت			İ	PEC	t brown	MOT,	7100 00		ait + .	4
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Ĺ	-			5.0			さタクナ			3: (Ro			
	-		İ		-		-2-4	Clay CH		EEL-S	XAAAA	- // /	<u>_</u>
	10 —	/4-0	<u> </u>				774	Clay (CA)	1100	En D		un O	\Box
	_	00	ME				no	leght) dules, d	Z	ive v.	Ctiff		\Box
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	_		ا رب	المدا		-		s above	J. 6	7 /1	htal	arowy).	7
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	<i>*</i> > —	150	ME			ŀ	at	15', NO.	s 4 [y	light 9	ray in	1116	\dashv
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	-					+	7,7				<u>.</u> .	14.0	
	20-	200	- <i>-</i>		, !	-		Clay (C)					
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(#	-		$\setminus \lambda$	/		-	11 girt	gray, as	o can d	ant Mi	wie.5	Mois	; /
	_		$\nearrow \bigvee$			-	Coar	ring in					7
	_	* /					12.5	fiff		Ch Ay	TIL.	۷	7
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BOREHOLE LOG

Ļ				<u> </u>			734-4-1
Ľ	TCL		SAMPLE		STANDARD	ent.	INSIDE TSA, NE
ELEWINON	DEPTH BELOW SURFACE	INTERWAL	TYPE & NUMBER	AECOVERY	FENETRATION TEST REMARTS 6"-6"-6" (N)	SYMBOLIC	Name, Gradation or Plasticity, Particle Size Distribution, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy, USCS Group Symbol
	-	20	CALE 5	5.0			from glavel, mostly yellow brown with light gray and black street = [MIN] Moist, 4: stiff CLAY TILL
	25 - -	25-0	CHE 4	5.0			CH as above, ~10 % gravel.
	30 	340 340	cne 7	50'	<u></u>		CH as above, light gray forlows pares des- fractures such as passibly old sicition cracks and possibly old
	- 35	35.1 55.0	CME 8	56			tracture 5 at 32.5; Fal clay (CH), red with aimor at 32.5; Fal clay (CH), plastre, minor Sand list oray, highly plastre, minor Sand
	40— -	4000	CNE 9	40		₹#.:'	Clayer gravel (GC) angular chart with red highly plastic Claymatric, The Most, Lange Resident
•	- - -	450			Loss		possibly highly weathered linestone in sampler Tip. Weathered linestone T.D. 45.5', Refusal on bad rock 0920, 2/12/99. Hole backfilled
	- -					:	With Cornet Wall benforte

_					-
_					
	**				
	Mar december	ISCON I	KNIKICEN	IPRIDDAE	ZATIFIN
	131		KNUDSEN		MINOI
_					
_	ENDARM		AL SERVICE	** ^******	
	EUTINO	TREETS I	AL DERVILE		

BOREHOLE LOG

Sheer _____ or __ Z

Project Number:

WP 476, Touk 15

Hole Number

T544-7

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	roject:	πE	SOUR	CF	INVE	لامال	1	۱	DCADON: - U.C C d	4 (1 4-7)	OF TSA			
10	oordinates	;	<u>- 7 //-</u>		_L N 1/40	71300	100-		WE Contra		UF 13H		 .	
1/2	0419	<u> </u>	3 N.	753	876.7	OE			660TE	LHNO	LOGY			į
0	rill Make as CME -	nd Mode	H:		1000			'	Top of Rock:		Depth Casing & Size		Hote Size:	
	evation:	34	2		,	Angle from Vers. and Bearing: Depth B				Depth Bottom of I	tom of Hole:			
W	ster Level:	HA		Fluid &	Additives:		Date Star	t /12	199	Oate Fr	nish:	إما	oger: <i>N.130</i> 会ら	
4	r i	7747	SAMPLE	1	NA STANDARD			2/12	411	SO.	2//2/99 IL DESCRIPTION		N.15055	
2					PENETRATION									
ELEWIN	DEPTH BELOW SURFACE	NTERM	TYPE A NUMBER	RECOVERY	6"-6"-6" (N)	SYMBOLIC LOG	Color, M	loistur	e Content,	Relativ	Particle Size Dist we Density or Cor CS Group Symbo	nsiste	on, ency,	
_	0	0					(0-35)	5,14	CLAY; m	·Hed	rdbin Higry	1; h	it-plas ; little	وللنور
	7			35/4	NO REC	Ìi	20mg 4 11	" 757	r. 14-11 g	ح≥ ح4	rel, damo:	1.04.	ff rawork	٦. ٦
	-		/- 3me	274	FROM	CL	UD 09,00	' , "	IN Dr stan	۶۰ زب	Drnodo st	<u>.</u>	· · /· · · · · · · · · · ·	⁻ 7 ┪
	-) ME		1-15								Frencholow	File 3
		4			<u> </u>	Λi	(35-5)	51/4	y clay; k	1/ k j s	freel plans	kitt	lescet some	2/4/5
	<u> </u>	7				V	daup	fun	r; organ	اس رید	lov ; to soul	; 10	-6	
	_		N	ر ہے			\	*****					_ /-0-0-0-0- /0/1	
,			7-3W.	5/5	NA		15-16-	5)(ZAY jm	illed	Erd ben ! Hig	ray	highplas;	little_
			3		′'''		sut;	some o	aloy; tr	uf est	1 Leld some	L_{ij}	traindie o	oh 1
		9					(west	wed	11			ر ب		~ 7
		9				}	MUN	,		ز	damp; steel	i and	ided; no ode	グゴ
	س <i>مر</i> ا						אָטעויק.	54 8 m	is FOC	x na	lules			
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	-		- ju	7/3	HA.	СН								-{
	-		2.	ĺ	-						•			4
	-	p4	ļ .		ļ									-
	15 -	14						-						
	_		4	5/5							Tal.	L	ferrelivan	<u> </u>
	_	[mE-4				111 0		\ - <i>U</i>					
	_		3		ļ Ņ#	į	(76.5 -	رکک	5,14	CLAY	; Id bin ; m	ed p	olawi some sc	\mathcal{U}_{j}
		19		j	ļ	•	ا جمعان ا	برسور) //ttle_	H.a.	t submers		1 . La h	أرباركت
		17				1	grante	ومرينا	els; st	4	damp-dry;	4.	1	7
	20 —	1	6]			V	,	,	1 -7)	no i	over;	╗
	-	ĺ	CME-S	ر ابر										†
	-		1	515	N#	CL								4
	-		"			1								┥
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	25 _	21	حار کھیں	1515	AN	1	_ , į į į	-0-S0	- WWW.	5744	- seb cont	OA 7	ET AND THE	



BOREHOLE LOG

Singer: Z ol Z Project Number: WP-476, TASK 15 Hole Number TSA4-Z

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Ĺ	TZE	500	LLE	<u>.L</u> .	نعيبه لمستعين	7 /20	
-		Ş	AMPLE		STANDARD		SOIL DESCRIPTION
I EN EVATEUR	DEPTH BELOW SURFACE	INTERVAL	TYPE 4 HUMBER	RECOVERY	1251 PESULTS 6"-6"-6" (M)	SYMBOLIC	Name, Gradation or Plasticity, Particle Size Distribution, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy, USCS Group Symbol
	25	24	و	5/5			Suppl fordsorption
	-	29	Cme	15	NA	CL	
	30 -	29	7	5/5			
	-		CME	•	NA		[CLAY TIL]
	35	<i>34</i> 34			<u> </u>		(33-40) Clayer Branel; white: 14 gray gravel; red _ metrix; little v. plas fines; v. dene; gravel is chart 15 _
	-		₩E-8	5/5	NA	GC	np to 3" mays damp; p. sor ted; grack mod wealhard, no odor notrix from 38-39 is v. 11.5 my ~1 < chart
	40 —	39 40	55 -1	1/1	HA	_	Boring Hermotecles 39' bag due to anyer!
	-					<u> </u>	compler represel your suspected bedrock;
	-	-					Boris bulifelled w/ bestonte shorry upon -
		† 					Touples collected in I gal Englores to 25' mleries -
	-						as composition for PID headspool onelysis.

(1)	MORRI
~=/	

BOREHOLE LOG

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C	cordinales.	:						Oriting	Contrac	tor:				
	<i>104 /</i> Nako ar				<u>. 153</u>	<u>828</u>	1.021	Depth Top (10006-	pth Casing	A Size:	Hoje Size	
	OME-		AT	V mo					N/A		HA		Hole Size:	. 11
E	evebon:	10. E	~~			Angle from Vert. and Bearing: Depth Bottom					of Hole: 28.5"			
w	ster Level:		7	Fluid &	Additives:	Ve.		79/99		Date Fine	tonner			
Ц	,	√ 4		<u> </u>	NA STANDARD		<u> </u>	19199			0/99	·	N. 1305	ڪ
_			SAMPLE		PENETRATION TEST					SOIL	DESCRIPT	ЮN		
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BOREHOLE LOG

Shee: 2 of Z
Project Number:
WP 476, TASK 15

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BOREHOLE LOG

Sheet _____ of ______ Project Number: WP-47C , TASK 15 Hole Number TSA5-2

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BOREHOLE LOG

Shee: Z of Z

Project Number:

WP - 476, TASKS

Hole Number

TSA5-2 Project: TCESE CORNER OF TSA SOURCE INVESTION TON STANDARD SAMPLE SOIL DESCRIPTION HINETHATION TEST RESULTS Name, Gradation or Plasticity, Particle Size Distribution, NTERWA Color, Moisture Content, Relative Density or Consistency, 8"-5"-8" Soil Structure, Mineralogy, USCS Group Symbol (M) (135-28) See pal for cheser ption **Z**5 Ų. 5/5 い HA. ु 28.5 (8:30) Clayer Correct justice - 15 say cheri (155 same (up 1030) 28.5 little viples tomo; clay matry is red bin; videnc; day 15/15 GC N٨ 30.0 subangular. suisional provide appear mad wea 30 Boring terminated a 30' boys due to awar / songer refusal upon invenerable Resident Bo bockefulled of ben-town slung. - Surplus collected in Gal Zip'ores @ 2.5' 35 Intervals as composites for on-site PID herebopoer screening

				
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BOREHOLE LOG

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BOREHOLE LOG

TASK 852

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BOREHOLE LOG

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				, v	5/5	НА		1					4		
		-		CME-S		'"									
		_	24	3											
		-	24	10	01.0		†				ن 🚅 ن	Ave Lerve	[درسال		
	- [.	—÷′≥2	27	CWE . VO	515	MA					LNa	TIVE HEADE			

BOREHOLE LOG

Project Number: WP-476, TASK IS
Hole Number
TS4 - 5-44

							TSA - 5-4
Pĸ	pect						Location:
	TCE	್ರಾ	IRCE		NVESTI	GATI	
·T	·	<u> </u>	AMPLE		STANDARD PENETHATION		SOIL DESCRIPTION
ELEWATION	DEPTH BELOW SURFACE	MTERVAL	TYPE A NUMBER	RECOVERY	1997 REPLATS 6"-6"-6" (N)	SYMBOLIC	Name, Gradation or Plasticity, Particle Size Distribution, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineratogy, USCS Group Symbol
	25	24	2	5/5		C#	See pg. 1 for discription [Native Ferrelview
	-	29	CmC-	45	NA		(26.5-37.5) Sitty CLAY; rd brn; med plas; some sitt; some clay; little of gly; suborn soud; to him
	- 3⇔	21	}	<u></u> :_	 		prantice peto; abundant MNOx -
	-		7-3mc	515	NА	CL	Staring no octor , white
		34	3			ļ	
	365 —	34	me-8	र्डाड	AA		[CLAY TILL]
	- -	39 39	Emis-9	1/1	AA	GC	1375-40) Clayer GRAVEL; Hyry subon chart gravel; ed but clay matrix; little play fine; vidure; dange, p. sorted; weathered; no odor (Rosidum)
	40 -	7 40	CALL OF	<u>'''.'</u>	135	 -	Born termetal \$2 40' bap due to sarple
	- -						Res has
	- 45 —						Residence.
	-	 -					Boring buckfulled w/ bentoute sturry upon
							Completion.
	20-	1					Simples collected in Igol Ziplans 225'
						ŀ	intervals as composites for PID headsport
	-	-					

	MORRISON KNUDSEN CORPORATION ENVIRONMENTAL SERVICES GROUP BOREHOLE LOG												of	2
				د	BOI	REHC)LE L(OG		Ta fole Num TSA		52		
	Project:	at	the	C	rem F									
	Coordinates 1041 Drill Make a	500	<u>- 75</u>	M	7539	36.36E Geo Fech no log					69Y			
	CMR Elevation:	<u>- 7</u>	5		Ang	Angle In	on Vert. an	Depth Top of A 35.0 d Bearing:	,	Depth Cas	eng & Size: Bottom of H	444"/814		
	Water Level	66:	<u> </u>		Additives:	Ve		n 0750	Date	Finish:	3 <i>5</i> .5	Logge		
_	<u> </u>	<u> </u>	SAMPLE 30"	<u> </u>	STANDARD PENETRATION TEST	4	211	0/99		OIL DESCR	PTION	14.	PCM	421
NOTAM III	DEPTH BELOW SURFACE	INTERNAL	TYPE & NUMBER	RECOVERY	6"-5"-6" (N)	SYMBOLIC	Name, Gradation or Ptasticity, Particle Size Distribution. Color, Moisture Content, Relative Density or Consistency, Soll Structure, Mineralogy, USCS Group Symbol							
1800	1 -	ð	CME 	5.0			برواها	clay (Lafino, c, more st, v. s upper F	fill	- <i>- J</i>	センノセイ	ے زیرا	e pro FeC , Mai w Cla	part ssives
*80S	5 <u> </u>	5.0 5.0	CME 2	50				das a cutly los				-	5/ PM 5-1-1	edom
	10 -	10.0 10.0	сме 3	50			9	CH as a	1.60V Un 0	e, from	ecu- Ls,-	5 a 5 /1 cs		
	15-	15.0 15.0	CME 4	50		-	MAGE	Clayle fighty for visty s above	7	سمان مسده	17.5	, , <u> </u>	rded wbn rcaks L o.o',	incre
1830	20_	20.0 20.0	CME 5	50			A	MAO nore di sabove screas	gand 15ean , da	inate mp, s	I in	i tra	dof. cket	



BOREHOLE LOG

Shee: 2 of 2
Project Number:
Task 852
Hole Number

╸,				<u> </u>			T5A-6-1
ľ	Project TC	F.A.	+ 4	6- 0	hem.	PI	- II costico
. •	<u> </u>		SAMPLE		STANDARD PENETRATION	' / -	SOIL DESCRIPTION
MOITWE IE	DEPTH BELOW SURFACE	MTERWÂĹ	TYPE & MUMBER	RECOVERY	7EST RESULTS 6"-6"-6" (N)	SYMBOLIC	Name, Gradation or Plasticity, Particle Size Distribution, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy, USCS Group Symbol
40	-	250	CME G	50			Fat Clay (CN) - 20% Sand, -10% of inc to Coarse gravel, Mothed yellow Brown, light gray and black (MAD), damp, V. Stiff CLAY TILL
	30-	<u>30.0</u> 30.0	CME			<u> </u>	Fat Clay (CH) - 10 % Sand, Miner fine gravel, Mothed orange brown, light gray-and black, Massive, Moist, Very Stiffs
			7	5.6	,	_	30-33' as above, reddish brown a light gran
•	35	15. 0	SPT		32/4"	-	matrix highly plastic, light brown to black, molsing weathered limestone T.D. 35.5', 0900, 2/10/99
	-	` .					Hole backfilled with Groot Well bentonite slarry
	40						_
		-					
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	-						
	-		_				_
	-						

Ī					N CORP		ION			· ·	Sheet 1 ot 2
	EN	VIRONI	MENTAL	SERV#	CES GROU BOF		LE LOG				Project Number: Task 852 Hole Number TYA - 1 - 2
7			+ H	ie C	hem.	Pla	ent			CA, SE	I SA - C C
L	Octdinates /04 hill Make a	144		71	753	928	. 5-4E	Oriting Contra	<u>leci</u>	(no/09)	: Hole Size: /
Ę	CME		<u>5 4</u>		ange	Angle fro	om Vert, and Ba	34.0		Depth Bottom o	41/41" 8/4-
V	kater Level		4.8	-	Additives:	۷	Date Start: /	<u>1</u> 520	Date F	34.5	4. Benfe
L	<u> </u>		SAMPLE	<u> </u>	STANDARD PENETRATION	Ţ 	2/9/9	9	<i>ارج</i> ا عد	9/99 DESCRIPTION	H. Benfe
ELEVATION	DEPTH GELOW SURFACE	INTERVAL	TYPE A NUMBER	RECOVERY	TEST MESULTS 6"-5"-6" (N)	SYMBOLIC	Color, Moist	ture Content,	Particle Size Dis we Density or Co CS Group Symb	onsistency,	
	-	0	CME /	5.0	·		Stiff	, (Boxai	rna-	like with	Maist, very
) : !S		5.0	S S	Ś			gray Fe C	5°, CA With nodu	MI les	nor or	, mostly light age brown, asided.
	10	- 10-0 CME 3 5.	5.0		-	6 ju	egrav Estr Win	eak ired	=5@ /M-	sandand slepasided sand, -10%	
	15-	150 150	см <i>є</i> 4	50'		- 	Fat Co	SFERT SMAST LOSA	1	20% 50-	d, ~5% fine own with ligh (MAOS daug) xture CLAY TILL
0	20- - - -	20.0 Za:0	CME 5	5.0	·		1.	a have	Da	ker chih	CLAY TILL S , MASHY TAY SEEMS to MINISTERS -:)

BOREHOLE LOG

Sheet _____ of ____ Project Number: TASK B52 Hole Number T<A-(--2

Ļ	leniani.				·		13A-6-2					
Ľ	TC	EO	ut,	the !	Chemi Plant Inside TCA, SE							
			SAMPLI		PENETRATION		SOIL DESCRIPTION					
ELEWATION	DEPTH GELOW SURFACE	WITCHWAL .	TYPE	MECOVERY	TEST PRESULTS 6"-6"-6" (N)	SYMBOLIC	Name, Gradation or Plasticity, Particle Size Distribution. Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy, USCS Group Symbol					
	- - 		ME 7	50			FotCLAY (CH) trace sand, some FOO nodules, reddish brown with					
	シー - -	30. 0		40'	·	- - · ·	Light gray of black following paleo. des- sication fractures, Moist, v. Stiff, high Plastic - CLAY TILL					
	-	54-D	SPT		3460	(Clay of gravel, Clay Matrix Righly- Plastic, light brown to black, Most agase, about Man - Rocchuna.					
	35—			;			weathered / Micstores					
	_	:				- !	T.D. 34.5 1630, 2/9/99 -					
	_						hole backfilled with Grout - Well bentonite sturry					
		·				į	<u> </u>					
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	-						<u></u>					
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	4											
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BOREHOLE LOG

١L.												7	54-6	-3
P	roject:		L	10	<i>a.</i> () <u> </u>		Location:		- 0 - 0 -			
1	COCCUPATION OF	<u>~</u>	25	Me.	Chem	1. //	a AT		Dritting Contra		A,SE			
			204	N	75393	3 /	2				Karo 1094			
þ	Y₩ Make a:	nd Mode	H:					Dept	th Top of Rock:		Depth Casing & Size):	Hole Size:	
L		<u>- Z</u>	<u> 5 4</u>	<u>ک.</u>	auge		- 35.0					444	<i>374"</i>	
L	Devation:	66	4.2				m Verl. and				Depth Bottom of 35.5			
١	Vater Lavet		•	Fluid &	Additives:		Date Stat	t /2	50		inish: 1415 9/99	u	2 Ban	2.6
L			SAMPLE		STANDARD	i	2/9	+	99	-,	7/77 XL DESCRIPTION		7.7.7	-7-1
_			301		PENETRATION TEST	l								
Ē		4		E S	RESULTS	3					Particle Size Dist			
ă	ESE.	WTÉRWA		ECOVERY	61-57-61 AN	.	Soil Str	HORSE Market	ure Content, re Minerator	Helati v USY	ve Density or Co CS Group Symbo	(1515) 1	елсу,	
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				50			_	٠	sal Fe		elview			Ī
	-		ŀ				12	<u>,</u> – ,	14.5° W	iast	4/9/24			, 7
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	15	150	<u> </u>	- -	ļ	 .	Frest	Cla	Y(CH) X	114	-15%	Sa	well y	restout
	_	صح	CHE			l .	·/	_/		<i>-</i> 1	winer In	44	م کیسر ہ	_ /مسه
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	-	{			1	j	I REY	L,	18, 10	con	ase in	مک		7' "-
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BOREHOLE LOG

Task 852 Hole Number

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' [TOJECT:		+1	1.	hans	D	lant inside TSA, SE
	<u> </u>	<u> </u>	SAMPL	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,) BINDON		SOIL DESCRIPTION
BLEWTHON	DEPTH BELOW SURFACE	WERMI	TYPE & NUMBER	RECOVERY	PENETRATION TRAT RESULTS 6"-6"-6" (N)	SYMBOLIC	Name, Gradation or Plasticity, Particle Size Distribution, Color, Moisture Content, Relative Density or Consistency.
	- -	250	CHE	50	•		et 28', Fat Clay (CH), reddish brown
	30- 30-	30.D 300	CME	,		_	With Miner light gray, FeO module Miner sal algorith, Some Mano Miner sal algorith, Some Mano Streats CLAY TILL (Very similar For Ferrelview - 18 clay Till)
	-	35.0	7	ا		_	Clay Graves (GC) well graded, Clay CH, yellow brown to black, Moist, Luce -
)	-		SPT		30/54		Hole back filled with
	- 40-		!	,			Grout Well benforite slurry
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	-			•			
	- -						- -
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(•••				EN CORP CES GROU		ÜŅ				Sheet of		
			,,,,,				LE LOG		1		725E 85		
					BOI		LL LOG				Hole Number 75A-6-4		
F	oject				····			Location:			134-6-		
L	702	a	1 1	he C	Kem	Pla	nt	SA					
Co	VIII)##160	·	207		5393			Geotechnology					
6	il Make a			//	<u></u>		De	oth Top of Rock	c De	pth Casing & St	Tel Hole Cire:		
Z	ME	<u>- 7</u>	5 /	/./ . <u></u>	·au	_	- No. and Pa	35:0	<u> </u>	Deets Berrer	444 /88		
==	waton:	44	4.4	43 °			m Vert and Be			Depth Battom of	m of Hole:		
W	der Level		·	Fluid 4	Addrives:		Date Start: 4	875	Date Finja		Logger A		
┕			SAMPLE	1	STANDARD	ī	2/9/	2/9/99 2/9/99 H-Ben- SOIL DESCRIPTION Name, Gradation or Plasticity, Particle Size Distribution.					
١,		<u> </u>	30"	<u> </u>	PRHETAATION TEST	1							
	π₹Ş	1		TECOVERY	PESULTS	SYMBOLIC				rticle Size Dk Density or C			
	DEPT BELOY SURFA	NTERM	TYPE A NUMBER	0	6"-6"-6" (N)	E S	Soil Structu	re, Minerak	gy, USCS	Group Symt	bol .		
4	550	- <u>Z</u>	<u> .F≅</u>	<u> </u>	 	97	ر مدیر سو	Jailla	~~~~	- A	With deep		
	_		Care	•			CAT CAL	7(27)	some	Feo M	with seins desperant was		
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ol	-	†	17	50			~ 10%	. Fine	grad	ad, ye	1100112000		
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	_]	15	50		ŀ	AS	an 1	, 2019		man 1 und to		
,	_		1				مسعك	c and	grav	er, 91	navel up to		
	-	1	1	1	1		18.9	Inch	ease	in M	HU.		



BOREHOLE LOG

Shee: ______ Project Number:

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		ojeci; TCE				em Pla	ent	t inside TSA, SE	•
	j		<u> </u>	SAMPLE		STANDARD PENETRATION		SOR, DESCRIPTION	
	ELEVATION	DEPTH BELOW SURFACE	INTERNAL	TYPE A NUMBER	ЯЕСОУЕНҮ	TEST RESURTS 6"-6"-6" (M)	SYMBOLIC LOG	Name, Gradation or Plasticity, Particle Size Distribution, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy, USCS Group Symbol	
	ĺ		250	ME				Fat Clay(CH) pockets of well gran	ead _
		_		,	50			Sand, Some graves, frue to	,
		2 7	36.0					brown, weist, W. Stiff- CLAY 7	_
091	4		30.0	CME	ا م			Fort Clay (CM) reldich brown, winer gravel	- 119 At
0 &	-	· [1	50			, FEO MORNIES, CLAY TILL	22.A
		ا	i 5.0					Provedy Clay, yellow from + black, happy pro Residualis - CH at to verify bed	rock:
	ŀ	35			<u>-</u>		7, 4	SPT refusal, weathered / intestone	n fep.
		- -						Dedrock. 2/9/99. Hole growted with Growt bentonite Surry	-
	ľ	40 - -						1,50 bag / 24 gals water	- 1
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BOREHOLE LOG

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Pr	oject: -7	7 <i>E</i>	S		Invest.		-	Location:	1.100	0F 7EA			
a	ordinates		-ow	نک ت	דן פשיעורייי	70-711	~	Dritting Contra	actor:	OF TSA			
L	104	1322		N	75393	3.6	3 E	GEDTE	THNO				
L	Make E			√- w	10UNT			Depth Top of Rock	i Di	opth Casing & Size		8.5*	3
٥	evation:	666	. 57	,	[/		m Vert, and	~ ~ ~ \		Depth Bottom of I			
W	ater Level			,	Additives:	V.	Class Shart		Logger //.	Racc	\neg		
Ч		MA :	SAMPLE	<u> </u>	AM STANDARD		<u>2</u>	17117	SOR	2/1/99 DESCREPTION	} ~~.	· · · · · · · · · · · · · · · · · · ·	\dashv
æ					PENETRATION TEST RESULTS		Name, Gradation or Plasticity, Particle Size Distribution.						
ELEVATION	± ₹	H.K.L	- Ki	WEA	6"-6"-6"	BOLK	Color, M	oisture Content	, Relative	Density or Co	nsistency,		
ELEY	81/18 1738 1430	INTERVAL	TYPE & NUMBER	ЯЕСОУЕЯ	(8)	SYME	Soil Stru	cture, Mineralo	gy, USCS	Group Symbo)ł		
	0	Ď					Bonis	colocated	1-5	North of	TSAL	-6.	
i			[3/3	NA	ĺ	1.18	colocated logy (cont	ade a	W CHOSE	ed in	T3A6-0	[۱
	_	3	Š					"J' Contr	ecro pr	1	1. 1	4.	
:	_	3					1.th 1	log. Lith	: cont	ocks corre	un coco	T19	
٠.	<u> </u>			٠.			descri	otion trans	TSAL	b-b should	be cef	erenced	
	r -		ME-2	5/5			her	this borne	. No	oder pres	ut dur.	- 5apl	<u>,</u> ;
•	_		me	15	HA		000	7-44 001	;	1		<i>U</i> - 1	-
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ı	EN/	/IRONI	4ENTAL	SERVI	CES GROUI	P					Project Number:	=
ı					BOF	REHO	LE LOG				WP-476, TASKE	<u> </u>
							,				Hole Number TSA しっし	
*	roject:		5 20.	10 000			1	Çoçabon:			73	_
Ļ	cordinates		300	re CE	LNO	E5776	CATION			OF TSA	· · · · · · · · · · · · · · · · · · ·	
ľ		-	. 9	71/	7539	24.	44	Oriting Contra GEOTES		LOGY		
Ī)riil Make a	nd Mode	H:		,,,,,,			th Top of Flock:		Depth Casing & Size		-
ŀ	CME- 5	55)	anv r	OUNT		Lania Iva	- North and Bar	36:59	Ø	Depth Bottom of	8.5	_
ľ		667	1.15	•			m Vert and Bea 27/CMC (36°		
V	Vater Lavel			_	Additives:		Oate Start:	3/19	Date F	inish: 2/9/99	Logger:	_
L	Τ.		SAMPLE	<u> </u>	NA STANDARD		210	2177	97	AL DESCRIPTION	N. Boss	_
_] ;	<u> </u>	4		PRINTTRATION TEST		<u> </u>				*	_
ğ	اق حــا	륗	-E	RECOVERY	RESULTS	BOLIC	Name, Grad	iation or Plan	Sticity,	Particle Size Dis ve Density or Co	tribution.	
ELEWATIO	DEPTH BELOW SURFAC	MTERVAL	TYPE & NUMBER	Į Š	5"-6"-6" (N)	30	Soil Structur	re, Mineraloj	gy, USI	CS Group Symb	ol	
<u></u>	0		ξź			NA S T S T S						_
	ľ _	0	_	<i>3</i> /3]	10-5) 511	ty CLAY;	mo Itlico	i ed bin It.	sriy ; hoga plas ; little	
	_		<u>با</u>	13	МА		Silty Sam	eclays to	· uf g	ty : feld sand	j V stiff ; tr sub	_
	_	3	£m£-			CL	any for est	Is grout	مهلىز	of I reworks	ed (compressed);	
	-	3			İ		no oder s	MaDe st	ten : .	Ex Dr nodule	; [Ferdulan Fill]	7
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	-	1	N	′ `	MA		11	ا ا	יניי	Marital rapid	ni Hary; hypholos;	-
	-	В	CME			l .	Ittle Silt	5 Some CI	زس	truf gty;	feld sone ; v. shff	<u>;</u> -
				/	<u> </u>	哆	44. Z O-D-		- 6- 2	march: day	e contrato e el De	_
	-	В		X			Stain; F.	Cornodi	ب زېپل	, , , ,	rieu (Nature)	_
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BOREHOLE LOG

Sheet . Project Number: WP476, Taok 15 Hole Number TSA6-6

77	<u> 5</u>			I-NUCST	1071	TON SE Corner of TSA SOIL DESCRIPTION
DEPTH BELOW SURFACE	INTERVAL	TYPE 4 F	RECOVERY	PERSTANTION TEST MESULTS 6"-6"-6" (N)	POG BYMBOLIC	Name, Gradation or Plasticity, Particle Size Distribution, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy, USCS Group Symbol
25 _	∂3 3 8	7-9WO	5/5	MA		(15-33) See ps 1 for description
30 —	a6	Cme.7	5/5	MA	CL.	
35-	33 33 33 36	Cm6-8	3/3	HA	СС	(up to 3°); little uplos fine; clay matrix is red bin; vidence; clay matrix is red bin; vidence; claypos for sold providence; claypos for sold providence; weather-ul [Randwill]
40 —						Bory terminated a 36' bap due to refusal upon confirmed Dedrock. Boris beech Borlington.
_						- Samples collected in I god Zeploes 12 2.51 Intervals as composites for on-site PID head Space screaming.
						_